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National Aeronautics and
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MHR-13

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Historical Annotated Bibliography: Space Station Documents

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FOREWORD

The Marshall Space Flight Center maintains an active history program to assure that the foundation of the Center's history is captured and preserved for current and future generations. As part of that overall effort, the Center began a project in 1987 to capture historical information and documentation on the Marshall Center's roles regarding Space Shuttle and Space Station.

Working under Contract NAS8-35900, three historians employed by MSI, a Division of the Bionetics Corporation, began compiling bibliographies, chronologies and oral interview transcripts. MSI historians Jessie E. Whalen and Sarah L. McKinley did the work for Space Shuttle while historian Thomas G. Gates did the work for Space Station.

The products that the historians have prepared are intended to provide supportive research essential to the writing of formal narrative histories of Marshall's contributions to the Space Shuttle and Space Station. The products will also help ensure that historically significant facets of Marshall's involvement in both programs are not overlooked or lost, whether they be in the form of events, documents, or personal interviews.

This supportive research is that which is basic to any historical research project and is not intended to be an end unto itself. It is designed to give the historian the necessary data from which to compile the aforementioned written histories and to preserve records of historically significant aspects of Marshall's involvement in Space Shuttle and Space Station.

This document is Marshall History Report 13 (MHR-13), the **Historical Annotated Bibliography: Space Station Documents**. It contains information regarding documentation which has been produced in the Space Station Program. The information will enable the researcher to locate readily documents pertinent to his study.

Questions concerning this document should be directed to the Marshall Space Flight Center Historian, CN22, Marshall Space Flight Center, Alabama 35812.

PREFACE

The Space Station History Project is on-going; therefore, the following **Bibliography** will be updated and amended continually. If there appear to be gaps or omissions in this data, they should be rectified as research continues.

All of the documents in this **Bibliography** are reposed in one of two permanent locations. Documents which have a document identification number prefixed with the letters STHDC are part of the Space Station Historical Documents Collection maintained by the MSFC Space Station History Project in the MSI History Office. All other documents can be found in the MSFC Documentation Repository through normal document retrieval methods.

The first section of the **Bibliography** contains a **List of Documents** from the Space Station Program listed according to the dates of their production; document identification numbers for each are also given. The following section contains **Abstracts** for each of the documents describing in detail the substance of each document. Indices follow the abstracts and provide additional data. The **Author Index** lists the authors of the individual documents; if there is a blank space next to a listing, then no author was given. The **Sponsor Index** lists which NASA centers were responsible for the documents. The **Producer Index** lists the NASA projects offices or contractors which were responsible for the production of the documents. The **Contract Index** lists the contracts under which documents were produced; if there is a blank space next to a listing, then the document listed no contract number. And finally, the **Keywords Index** is a listing of keywords for each of the documents.

In order to cross-reference the data in this **Bibliography**, one should use the dates of production and document identification numbers as links from the **List of Documents** and indices to the abstracts. For example, if one desired to read about a particular document in the **List**, by using the date and identification number one could easily find the document in the abstracts. The same method may be used in any of the other indices. By the same token, if one sees an abstract and wants further information as found in one of the indices, the same method of cross-referencing applies.

The separately bound **MSFC Space Station Program Commonly Used Acronyms and Abbreviations Listing** should be consulted for acronyms and abbreviations used in the **Bibliography**.

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	Space Platform Program Summary	TRW8-33956-PS
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82/01/12	Space Operations Center System Analysis Study Extension-Final Briefing	D180-26785-3
82/01/13	Space Operations Center Shuttle Interaction Study Extension Final Review	RI-PD82-1A
82/02/01	Evolutionary Science and Applications Space Platform- Characterization of Concepts- Tasks A&B Final Briefing	MDC-G9766
	NASA Space Platform Solar Array Design Description	LMSC-D836880
	Space Operations Center-Shuttle Interaction Study Extension Final Report vol. 1	SSD-81-0194
	Space Operations Center/Shuttle Interaction Study Extension Final Report vol. II Appendixes	SSD-81-0194
	Space Platform Ground System Study	MDAC-33955-SPGSS
82/02/05	Memo, Subject: MSFC Contract NAS8-33956, Alternative System Design Concept Study of the 25kW Power System; Submittal of	25kW-PS-1129

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		34444.002-007
82/02/10	Flight Operations Analyses- Splinter Meeting-MSFC Wednesday, 10 February 1982	TRW8-33956-FOA-SM
82/02/11	Space Platform FY 82 First Quarter Review February 1982 Payload Accommodations and Flight Operations Splinter Meeting	MDAC8-33955-FY82
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82/02/12	Space Platform FY 82 Study First Quarter Review February 1982	MDC-G9761
82/02/18	MDAC Payload Accommodations/Flight Operations FY 82 Study, 1st Quarter Review Splinter Meeting	MSFC-EL14-14-82
82/02/19	Alternate System Design Concept Study of the 25kW Power System Monthly Progress Report for January 1982	34444.013-019
82/02/22	TRW Ground Segment Review- Interim	TRW8-33956-GSRI
82/02/23	Minutes, MDAC Space Platform Communications/Data Management/Software Splinter Session	MSFC-EF22-SSS
	Minutes, TRW Space Platform Data Systems and Ground Station Splinter Session	MSFC-SP-GSSS-2/82
82/02/26	Facsimile transmission, Crawford to Beam, 2/26/82	MDAC8-33955-GQSPU
82/03/01	Science and Applications Space Platform Payload Accommodations Study - Space Platform Payload Data	SP82-MSFC-2583
82/03/02	Manned Spacecraft Criteria and Standards	J8400045
82/03/08	Letter, Novick to Powell, 3/8/82	SP-1192
82/03/15	Space Platform Alternate System Design Concept Study Supp. Agr. #5-Progress	MDAC8-33955-SA-5

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82/03/24	Space Platform Ground System Study Interim Review March 1982	MDAC8-33955-GSS-IR
82/03/25	Space Platform Ground Systems Concepts and Requirements	MDAC-FACC-3/82
82/03/26	Transmittal of the Space Station Monthly Progress Report	MSFC-PM01(82-37)
82/04/05	Letter, Novick to Lea, 4/5/82	SP-1276
82/04/06	TRW Space Platform Mission Operations Review	MSFC-PM01(82-41)
82/04/09	Suggested Agenda - Ground Segment Review MSFC 22, 23 April 1982	TRW8-33956-GSR
82/04/12	General Specification NASA JSC Requirements for Material and Processes	SE-R-0006C
82/04/15	Space Platform Alternate System Design Concept Study, Supp. Agr. #5 Progress Report for the Month of March 1982	MDAC8-33955-SA-5 2
82/04/16	Alternative System Design Concept Study of the 25kW Power System Monthly Progress Report for March 1982	34444.013-021
82/04/22	Ground Segment Preliminary Report	TRW8-33956-GSPR
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82/05/01	Evolutionary Space Platform Concept Study Volume I- Executive Summary	MDC-H0072
	Evolutionary Space Platform Concept Study Volume II- Programmatic for Manned Space Platform Concepts	MDC-H0072
	Evolutionary Space Platform Concept Study Volume II- Technical Report Part B- Manned Space Platform Concepts	MDC-H0072

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	Historical Review of Space Platform Payload Requirements	PM007
82/05/14	Alternative System Design Concept Study of the 25kW Power System Monthly Progress Report for April 1982	34444.013-022
	Space Platform Status Review	MSFC-PM01(82-53)
82/05/15	Space Platform Alternate System Design Concept Study, Supp. Agr. #5 Progress Report for the Month of April 1982	MDAC8-33955-SA-5-3
82/05/21	MSFC News Release: NASA Center Issues Request for Proposal on Space Station Studies	MSFC Release 82-54
82/06/01	Alternative System Design Concept Study of the 25kW Power System Space Platform-Airlock/Adapter Preliminary Interface Control Document	34444.009-006
	Multi-100kW Planar Final Report: Planar Low Cost SA Development	LMSC-D843500
	Multi-100kW Planar Low Cost Solar Array Development Final Review	LMSC-SAR-100KW
	Mutli-100kW Final Review Planar Low Cost Solar Array Development	LMSC-100kW-FR
	Preliminary Interface Control Document DR-9 Part 1 Space Platform to Shuttle Orbiter Alternate System Design Concept Study FY 82	MDC-G9318
	Preliminary Interface Control Document DR-9 Part 3 Space Platform to Solar Array Alternate System Design Concept Study FY 82	MDC-G9318
	Preliminary Interface Control Document DR-9 Part 4 Space Platform to Tracking and Data Relay Satellite Sys. Alt. Sys. Design Concept Study FY 82	MDC-G9318
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	Space Platform Executive Summary	TRW8-33956-ES/82
	Space Platform FY 82 Study Midterm Review Executive Summary June 1982	MDAC8-33955-ES
	Space Platform FY 82 Study Midterm Review June 1982	MDC-G9798
	Space Platform Phase C/D Cost Estimate DR-6 Alternate System Design Concept Study FY 82 (Suppl. Agr. No. 5)	MDC-G9315
	Space Platform Programmatic Splinter Briefing June 1982	MDAC-33955-PSB
	Space Platform Study	TRW8-33956-SPS
	Terrestrial Environment(Climatic) Criteria Guidelines for Use in Aerospace Vehicle Development, 1982 Revision	J8400086
		TM-82473
82/06/14	Letter, Novick to Powell, 6/14/82	SP-1325
82/06/15	Space Platform Alternate System Design Concept Study, Suppl. Agr. #5 Progress Report for the Month of May 1982	MDAC8-33955-SA-5-4
82/06/16	Space Platform C&DM System Presentation	41-1555-00-07
82/06/17	Alternate System Design Concept Study of the 25kW Power System Mid-Term Review Briefing Volume 2	34444.002-008
	Alternative System Design Concept Study of the 25kW Power System Mid-Term Review Briefing Volume 1	34444.002-008
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82/06/21	A Proposal for Definition of Technology Development Missions for Early Space Station Orbit Transfer Vehicle Servicing Folder 2 Business Management	GDC-PIN-82-064
82/06/25	Memo/MDAC Operations Ground System Study Splinter Briefing June 1982	MSFC-MDAC-GSS
82/06/29	Alternative System Design Concept Study of the 25kW Power System Space Platform Summary	34444.000-004
82/06/30	Minutes, MDAC Communications and Data Management Splinter Session, Mid Term Review	MSFC-MDAC-MTR
82/07/01	Contract End Item Specification for Space Platform Solar Array	LMSC-D840454
	Space Platform Ground System Requirements	MDAC8-33955-SPGSR
	Space Platform/Power System Alternate System Design Concept Study Executive Summary	MDC-H0108
82/07/07	Comments to MDAC and TRW Study Plans	MSFC-SP-7/80
82/07/21	Space Platform Ground System Study Final Review	MDAC-33955-FR
82/07/22	Letter, Sharples to Powell, 7/22/82	SP-1345
82/08/01	Alternate System Design Concept Study Add-on Activities Final Report	MDC-H0126
82/08/10	MSFC News Release: NASA Selects Contractors for Space Station Studies	MSFC Release 82-75

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82/08/11	Space Platform Program Review	MDAC8-33955-PR
82/08/13	MSFC News Release: NASA Center Contract Negotiations Will Lead to Space Station Studies	MSFC Release 82-82
	TRW Interoffice Correspondence- Impact of Other Operations Upon Space Platform Ground Segment Design	SP-1371
82/10/01	Space Platform Mission Information Document Technical Report	SP82-MSFC-2623
82/11/01	An Approach Toward Function Allocation Between Humans and Machines in Space Station Activities	N83-19470
		NASA-TM-82510
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		MSFC-SSPDD-11-82-3
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	Space Station Systems Definition Book 5	MSFC-SSSD-11-82-5
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82/11/15	Space Station Needs, Attributes and Architectural Options Midterm Review	LMSC-NAAO-MTR
82/11/16	Space Station Needs, Attributes, and Architectural Options Briefing Material Mid-Term Review	SOC-SE-02-01
	Space Station Needs, Attributes, and Architectural Options Study Mid-Term Main Briefing	MDC-H0145
82/11/17	Mid-Term Briefing Space Station Needs, Attributes, & Architectural Options	SA-SSP-RP002
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82/12/01	E&D Subsystems Definition Study for the Space Station	JSC-18740

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82/12/14	Monthly Status Report Submitted to NASA MSFC 11/13-12/14 1982 for Contract NAS 8-34530 entitled Materials Processing in Low Gravity Program	UAH8-34530-SR-9
82/12/18	Space Station Needs, Attributes, and Architectural Option Study Mid-Term Briefing	D180-27305-1
83/01/01	Space and Planetary Environment Criteria Guidelines for Use in Space Vehicle Development, 1982 Revision (Volume 1) NASA Technical Memorandum 82478	J8400087
83/01/25	Navstar GPS Space Segment/Navigation User Interfaces	J8400015
83/01/28	Space Shuttle System Pyrotechnic Specification	J8400004
83/02/01	JSC Government Furnished Equipment (GFE) Materials Selection List and Materials Documentation Procedures	JSC-09604
83/03/02	Memo, Wright to Sharples, Subject: Tether Applications ; and Space Tether Operations: A Summary of Possible Uses	TRW8-33956-TA-83
83/03/08	Space Station Program Options--Capabilities First Draft	NASA-SSPOC-3/83
83/04/01	Advanced Platform Systems Technology Study Final Report Volume I Executive Summary	D180-27487-1
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	Advanced Platform Systems Technology Study Final Report Volume III Supporting Data	D180-27487-3
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	Space Station Needs, Attributes, and Architectural Options The Role of Man in Advanced Space Missions	MDC-H0536
83/04/05	A Study of Space Station Needs, Attributes & Architectural Options Final Briefing	GDW-3682-FB
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83/04/06	Space Station Needs, Attributes, and Architectural Options Study Final Executive Summary Briefing	SSD83-0037
83/04/07	Space Station Program Options, Architecture, and Technology	SSD83-0044
83/04/09	Space Station Needs, Attributes, and Architectural Options Final Briefing Part 5- Systems	SA-SSP-RP009
83/04/11	MSFC News Release: President Orders National Space Station Study	MSFC Release 83-24
83/04/15	High-Speed Machining of Space Shuttle External Tank (ET) Panels Final Report	LMSC-D059404
83/04/18	A Study of Space Station Needs, Attributes & Architectural Options Study Overview	GDW-3682-SO
83/04/21	Space Station Needs, Attributes and Architectural Options Study Final Report Volume 2 Mission Analysis	D180-27477-2
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	Space Station Needs, Attributes and Architectural Options Study Volume 1 Executive Summary	D180-27477-1
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	Definition of Technology Development Missions for Early Space Station Large Space Structures Final Review	BOEING8-35043-FR
83/05/01	General Specification NASA JSC Requirements for Flight and Flight Prototype Liquid and High Pressure Oxygen Components and Systems	J8400089
	Space Station Operations Study Plans, App. A	KSC-SSPDD-6A
	Space Transportation System EVA Description and Design Criteria	JSC-10615
83/05/02	Concept Development Group Document	MSFC-SS-DGS
83/05/13	Military Specification Drawings, Engineering and Associated Lists	J8400014
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83/05/31	Definition of Technology Development Missions for Early Space Stations - Large Space Structures- Final Report	D180-27677-1
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83/06/15	MBA Module Issues and Questions	MSFC-MBA-IAQ-6/83
83/06/24	A NASA Capabilities Evaluation Document Preliminary Draft	NASA-ED
83/07/01	Concept Development Group Document	MSFC-CDG-7/83-2
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83/10/01	Autonomous Momentum Management for Space Station Final Report	BENDIX8-35349-PR-1
	Space Station Mission Requirements Report	KSC-SS-MRR-10/83
	Space Station Program Description Document Book 2 Mission Description Document	MSFC-SSPDD-11-82-2
	Space Station Program Description Document Book 6 Systems Operations Document Appendix C Summary of Operations Studies (First Level White Papers)	KSC-SSPDD-6C
83/10/12	Space Station Interface Commonality Study Final Report	SRS/SE-TR84-006
83/11/01	Definition of Technology Development Missions for Early Space Station Briefing Material Interim Review	MCR-83-1864
	Definition of Technology Development Missions for Early Space Station Satellite Servicing Interim Review	MCR-83-1864
83/11/30	Memo, Member of Control Development Group to CDG Members, Subject: Work Package Subsection Tasks	NASA-WPST-11/83
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	Statement of Work Orbital Transfer Vehicle Concept Definition and System Analysis Study (OTV Phase A RFP Statement of Work)	JSC00066
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	Tethers in Space - Birth and Growth of a New Avenue of Space Utilization	NASA-TM-82571
84/02/29	MSFC News Release: NASA Sets Up Space Station Development Teams	MSFC Release 84-11
84/03/01	High Efficiency Automated Thermal Control System Study Systems Preliminary Design Performance Analysis and Specification-Steerable Radiator	SSD84-0041
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84/04/01	NASA Technical Memorandum Operational Modules for Space Station Construction	NASA TM-85772
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84/05/29	Earth Observing System Polar Platform Resource Module Interface Requirements	J8400074
84/06/15	Space Station Phase B Definition Studies Reference Document "Systems Test and Verification Plan Content Guide"	J8400082
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84/07/02	Space Station Advanced Development Program	J8400059
84/07/09	Final Report Space Station Automation Study Automation Requirements Derived from Space Manufacturing Concepts Volume 1 Executive Summary	GE5-25182-FR-ES
84/07/11	MSFC News Release: Marshall Awards Contract for Study of Orbital Transfer Vehicle	MSFC Release 84-57
84/07/18	Product Assurance Requirements for the Space Station Program	J8400001

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84/07/23	Exhibit A Statement of Work STS/Space Station Human Productivity Study	J8400079
84/07/24	MSFC News Release: NASA Selects Contractors for Orbital Maneuvering Vehicle Study	MSFC Release 84-67
84/07/26	Space Station Requirements for Tether Applications Final Report	MMC8-35499-FR
84/07/30	Space Station Integrated Logistics Support Plan	J8400071
84/07/31	Selected Tether Applications in Space An Analysis of Five Selected Concepts Final Report/Presentation	MMC8-35499-FR
84/08/01	Space Station Information System (SSIS) Final Study Report Volumes I Executive Summary & SSIS Final Study Report Volume II SSIS Architecture	J8400097
	Space Station Operations Plan	J8400067
84/08/08	Standard Breakdown Structure For Space Systems	J8400036
84/08/10	BCS-RIM -- Relational Information Management System Version 6.0 User Guide	J8400064
	Space Station System Operational Requirements Baseline Issue	J8400062
84/08/20	Orbital Debris Environment for Space Station.	J8400021
84/08/24	Section C Statement of Work For Advanced EVA System Design Requirements Study	J8400085
84/09/01	A Review of Micrometeoroid Flux Measurements and Models for Low Orbital Altitudes of the Space Station	NASA-TM-86466
	Astrophysics and the Space Station Volume 3 Satellite Servicing from the Space Station	J8400132
	General Specification Space Station Requirements for Materials and Processing	JSC-20149
	Ground Test Article for Deployable Space	RIC8-34657 BMR3

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84/09/01	Structure Systems Third Bi-Monthly Report	
	Natural Environment Design Criteria for the Space Station Definition and Preliminary Design (First Revision)	J8400040
		NASA-TM-86460
	Space Station Mission Requirements Report	MRWG-001
84/09/03	Ground Test Article for Deployable Space Structure Systems Third Bi-Monthly Progress Report	RIC8-34657-BMR3
84/09/13	Space Station Program Mission Requirements	J8400039
84/09/14	MSFC News Release: Space Station Proposals Sought	MSFC Release 84-79
	Payload Integration Plan Space Transportation System and Space Station Program September 1984	J8400038
	Space Station Lexicon Issue 1	J8400083
84/10/09	Definition of Technology Development Missions for Early Space Station Satellite Servicing Final Review	MCR84-1872
84/10/15	Autonomous Momentum Management for Space Station Final Report	BENDIX8-35349-FR1
84/11/01	Civilian Space Stations and the U.S. Future in Space (found in RSIC)	TL797C582 1984C3X
	Definition of Technology Development Mission for Early Space Station Satellite Servicing Phase 2- Final Report Volume II Technical	SSS-FR-04-01
	Definitions of Technology Development Missions for Early Space Station Satellite Servicing Phase 2- Final Report Executive Summary Volume I	SSS-FR-04-01
	Ground Test Article for Deployable Space Structure Systems Fourth Bi-Monthly Report	RIC8-34657 BMR4

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84/11/01	Space Station Automation and Robotics Study Operator-Systems Interface	D483-10027-1
	Space Station Automation Study Volume 1 Executive Summary Autonomous Systems and Assembly Final Report	MCR84-1878
	Space Station Automation Study Volume I Technical Report Autonomous Systems and Assembly Final Report	MCR84-1878
84/11/15	Space Station Definition and Preliminary Design Volume II Management Proposal	D483-10001-1
84/11/26	Space Station On-orbit Maintenance Operations Study Monthly Progress Report for October, 1984	MDAC8-35982-PR-6
84/11/27	Final Report Space Station Automation Study Automation Requirements Derived From Space Manufacturing Concepts Volume II Technical Report	GE5-2512-FR-TR
84/11/30	Definition of Satellite Servicing Technology Development Missions for Early Space Station Phase II Volume I Executive Summary	Z400.DMW.014
		Z400.DMW.014
	Definition of Technology Development Missions for Early Space Stations Large Space Structures Phase II	D180-27677-2
	MSFC News Release: NASA Center Awards Contract for Orbiting Laboratory	MSFC Release 84-96
84/12/01	Space Station Mission Data Books and Customer Accommodation Plans for Early Missions Volume I	J8400070
	Space Station Systems Technology Study Final Briefing	D180-28364-3
84/12/20	Space Station Automation Study-Satellite Servicing Volume II Technical Report	Z410.1-84-175
85/01/01	Ground Test Article for Deployable Space Structure Systems Fifth Bi-Monthly Report	RIC8-34657 BMR5

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85/01/16	Space Station Body Mounted Radiator Systems Progress Report No. 8	3-14000/6R-4
85/01/28	Space Station Phase B Definition and Preliminary Design of Canadian Contribution	CANADA-WP-SOW
85/02/01	Japanese Phase B Activities on the Experiment Module [Statement of Work]	JEM-SOW
	Reference Configuration of the Japanese Experiment Module for Phase B Activities	JEM-RC
	Space Station Systems Technology Study (Add-on Task) Final Report Volume I Executive Summmary	D483-10012-1
		D483-10012-1
	Space Station Systems Technology Study (Add-on Task) Final Report Volume II Trade Study and Technology Selection, Technical Report	D483-10012-2
	Space Station Systems Technology Study (Add-on Task) Final Report Volume III Technology Advancement Program Plan	D483-10012-3
85/02/18	Columbus Preparatory Programme - Definition and Preliminary Design (Phase B1)	RFQ/3-5250/85NLAB
85/02/25	Automation and Robotics for The National Space Program Automation and Robotics Panel	CSI/85-01
85/03/01	Ground Test Article for Deployable Space Structure Systems Sixth Bi-Monthly Report	RIC8-34657 BMR6
	High Efficiency Automated Thermal Control System Study - System Preliminary Design, Performance Analysis and Specifications	SSD85-0017
	NASA Technical Memorandum Advancing Automation and Robotics Technology for the Space Station and for the U.S. Economy Volume I - Executive Overview	NASA TM-87566
		NASA TM-87566

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85/03/01	Space Station On-Orbit Maintenance Operations Study Final Report	MDC-H1376
85/03/08	Statement of Aaron Cohen before the Subcommittee on Science, Technology, and Space Committee on Commerce, Science, & Transportation United States Senate	NASA-SSTS-3/85
85/03/12	JSC Work Package-2 Phase B Readiness Review Presentation	JSC-WP2-RRP
85/03/14	Testimony of Robert A. Frosch Before the Subcommittee on HUD and Independent Agencies of the Senate Committee on Appropriations	NASA-SHIA-3/85
85/03/26	NASA Space Station Automation: AI-Based Technology Review Executive Summary	SRI2-11864-ES
85/04/01	Guidelines for Space Station Data Systems Standardization	J8400096
	NASA Space Station Automation: AI-Based Technology Review	SRI2-11864-TR
	Rockwell "Function Tree"	RI-SSSD-FT
	Rockwell "Hardware Tree"	RI-SSSD-HT
	Space Station Common Module Power System Network Topology and Hardwar Development Study Plan	MCR-85-621-000
	Space Station Configuration Description	JSC-19989
	Space Station Configuration Description Systems Engineering and Integration	JSC-19989
85/04/10	MSFC Phase B Readiness Review	MSFC-PB-RR
85/04/12	Review of the Space Station Program Design Criteria and Practices Document	MSFC-KA01(85-59)
85/04/15	Space Station Definition and Preliminary Design, WP-01 Advanced Development Plan	SSP-MMC-00001
85/04/23	Johnson Space Center Space Station Projects Office (WP-2) Orientation Briefing	S-85-06563A
	Space Station Systems Division	SS-WP2-KOM-RI

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85/05/01	Ground Test Article for Deployable Space Structure Systems Seventh Bi-Monthly Report	RIC8-34657 BMR7
	Payload Integration Plan Space Transportation System and Space Station Program	JSC-18508
	Space Station Data System Analysis/Architecture Study Task 1- Functional Requirements Definition, DR-5	MDC-H1343
	Space Station Data System Analysis/Architecture Study Task 2- Options Development, DR-5 Volume I- Technology Options Preliminary Draft	MDC-H1940
		MDC-H1940
		MDC-H1940
85/05/03	Management Plan DR-01 (Update) Review Copy	RCA-DR01-1
	Space Station Work Package 2 Definition and Preliminary Design Phase Advanced Development and Technology Assessment	SSS85-0027
	Space Station Work Package 2 Definition and Preliminary Design Phase Management Plan	SSS85-0010
	Space Station Work Package 2 Definition and Preliminary Design Phase Technology Investments	SSS85-0026
85/05/06	Space Station Program Configuration Description Application Program	D483-50004-12
85/05/09	Schedule for POP 85-2 Activities	MSFC-KA02(85-02-077)
85/05/10	Space Station Work Package 3 Definition and Preliminary Design Commonality Candidates	GE/TRW-CC-WP3
85/05/16	Letter, Pensiero to Britner, 5/16/85, Subject: Commonality List	RCA-SS-SE&I-PPL
85/05/17	Space Station Design and Development Phase WBS and WBS Dictionary	D483-50008-1
	Space Station Work Package 3 Definition	GE/TRW-WP3-PLO

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85/05/17	and Preliminary Design Proposed List of Options	
85/05/23	Space Station Program Configuration Description Document Orbital Maneuvering Vehicle/Orbital Transfer Vehicle Accommodations	D483-50004-11
85/05/30	Space Station Data System (SSDS) Analysis/Architecture Study Draft Task 1 Report- Revision 1 Parts 1 & 2	SSD-TR-101-5-85
85/05/31	Space Station ACS Test Bed Modification and Refurbishment of Skylab's CMG's and Related Equipment Monthly Progress Report April 15 thru May 31, 1985	BENDIX8-36408 PR1
85/06/01	A Worst Case Thermal Assessment of the Spacelab EM002 Pallet for the Space Telescope Maintenance Mission	MDC-W5025
	Space Station ACS Test Bed Modification and Refurbishment of Skylab CMG's and Related Equipment Monthly Progress Report June 1985	BENDIX8-36408 PR2
	Space Station Definition and Preliminary Design Preliminary RUR-1 Inputs Nineteen Major Program Themes and SE&I Support Tasks	MDC-H1983
	Space Station Definition and Preliminary Design Work Package 2 Monthly Status Report For the Period 19 April 1985 through 31 May 1985	MDC-H1982
	Space Station Definition and Preliminary Design Work Package 2 Time- Phased SE&I Study Products (DR-19, DP 2.1) Book 1 Introduction and Summary	MDC-H1952
		MDC-H1952
		MDC-H1952
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	Space Station Environmental Control/Life Support (ECLS) Integration Analysis Monthly Progress Report for May 1985	ECLS R0001
	Space Station Program Reference Update	ISTF-RUR1

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85/06/01	Review (RUR-1) Data Products for The Canadian Integrated Servicing and Test Facility (ISTF)	
85/06/04	Space Station Program Configuration Description Document Common Module Structural/Mechanical	D483-50004-5
	Space Station Program Configuration Description Document Communication Subsystem	D483-50004-4
		D483-50004-4
	Space Station Program Configuration Description Document Data Management Subsystem	D483-50004-7
	Space Station Program Configuration Description Document Electrical Power	D483-50004-2
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85/06/05	Space Station Program Configuration Description Document Logistics Module Outfitting	D483-50004-10
	Space Station Program Configuration Description Document Reboost	D483-50004-13
	Space Station Program Configuration Description Document Thermal Control System	D483-50004-3
85/06/06	Project Management Review Review Documentation WP01 DR-13	TBC8-36526PMR6-85
	Space Station Definition and Preliminary Design, WP-01 Project Management Review	SSP-MMC-00008
	Space Station Program Configuration Description Document Environmental Control and Life Support Systems	D483-50004-6
	Space Station Work Package 2 Definition and Preliminary Design Phase Time-Phased SE&I Study Products Data Package 2.1 Appendix B Part 1	SSS85-0034
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85/06/06	Space Station Work Package 2 Definition and Preliminary Design Time- Phased SE&I Study Products Data Package 2.1 Volume 1	SSS85-0034
	Space Station Work Package Definition and Preliminary Design Phase Time- Phased SE&I Study Products Data Package 2.1 Volume 2	SSS85-0034
85/06/07	Common Module Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Volume 2 Book 2	D483-50011-2
	Configuration Description Document Volumes 1 Through 13	D483-50004
	Laboratory Module Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Volume 3	D483-50011-3
	Space Station Definition and Preliminary Design, WP-01 Common Module RUR-1 Data Package 1.1a Volume 2	SSP-MMC-00005
	Space Station Definition and Preliminary Design, WP-01 Laboratory Module RUR-1 Data Package 1.1a Volume 4	SSP-MMC-00005
	Space Station Definition and Preliminary Design, WP-01 Logistics Module RUR-1 Data Package 1.1a Volume 3	SSP-MMC-00005
	Space Station Definition and Preliminary Design, WP-01 Management Plan	SSP-MMC-00004
	Space Station Definition and Preliminary Design, WP-01 Productivity Plan for Phase B	SSP-MMC-00007
	Space Station Definition and Preliminary Design, WP-01 Project Integration RUR-1 Data Package 1.1a Volume 1	SSP-MMC-00005
	Space Station Definition and Preliminary Design, WP-01 Propulsion/Vehicle Accommodations RUR-1 Data Package 1.1a Book B - Propulsion Volume 5B	SSP-MMC-00005
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85/06/07	Space Station Definition and Preliminary Design, WP-01 RUR-1 Data Package 1.1a Book A - Reboost Analysis Volume 5A	SSP-MMC-00005
	Space Station Management Plan WP-01 Draft	D483-50001-1
	Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Common Module Volume 2 Book 1	D483-50011-2
	Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Volume 1 Book 1 Integration	D483-50011-1
	Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Volume 1 Book 2 Integration	D483-50011-1
	Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Volume 4 Logistics Module	D483-50011-4
	Time Phase SE&I Study Products-WP01 DR-19 Data Package 1, 1A Volume 5 Propulsion & Vehicle Accommodations	D483-50011-5
85/06/10	Boeing FSCM No. 81205 Productivity Plan	D483-50014-1
	Monthly Progress Report for Space Station Rotary Joint Mechanisms Test Bed/Operations for June 1985	CE8-36585 PR1
85/06/14	Design and Development Phase Work Breakdown Structure (WBS) (Update) and WBS Dictionary DR-08 Draft for Coordination	RCA-DR08
	Space Station Work Package 3 Definition and Preliminary Design Design and Development Phase WBS Dictionary DR-08	GE/TRW-DR08
	Space Station Work Package 3 Definition and Preliminary Design Time Phased SE&I Study Products DR-19 Data Package Volume II Platforms	GE/TRW-DR19
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		GE/TRW-DR19-DP3-1
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85/06/14	Space Station Work Package 3 Definition	GE/TRW-DR19-DP3-1
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		GE/TRW-DR19-DP3-1
		GE/TRW-DR19-DP3-1
85/06/15	Space Station Definition and Preliminary Design, WP-01 Monthly Status Report Issue 1 Period Covered: April 19, 1985 through May 31, 1985	SSP-MMC-00006
	STS Operations and Engineering Classification Handbook	SS-STO-OE-CH
85/06/18	Space Station Definition and Preliminary Design Work Package No. 2 Project Review Documentation (DR-13) Contract Management Review 18 June 1985	WP2-CMR-8506
85/06/19	EMS Data Package Transmittal	EMS-DPT-RUR1-4
	Space Station Work Package 2 Definition and Preliminary Design Phase Contractor Management Review CMR No. 1 Monthly Status Report	SSS85-48
	Work Package Assessment Final Review	MSFC-KA4-84-VO42
85/06/21	Space Station Prelaunch Operations Plan	JSC-30202
	Space Station Reference Update Review (RUR-1) Work Package 01 MSFC June 21, 1985	EL-13591
		KA11 (85-11-100)
85/06/28	EMS Product GSFC - WP-3	WP3-EMS-C2.3.1/.2
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		WP3-EMS-C4.3.4
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	Space Station Design Convergence Canada Remote Sensing (RADARSAT) Data Package for RUR 1 Phase B	RADARSAT-RUR1
	Space Station Operations Analysis Common Module Outfitting Analysis, GSE Commonality Analysis, and Ground Verification and Checkout Analysis	SS-OCS-RUR1
	Space Station Operations Analysis Ground Verification and Checkout Analysis	EMS-S6.K.1
	WP-3 EMS Products	WP3-EMS PROD.

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85/06/29	Automation and Robotics Implementation Plan	JSC-30204
	External Thermal Data Base Geometric Math Model	JSC-30205
85/06/30	Research Study: Space Station Natural Environment Design Criteria Studies Quarterly Progress Report Reporting Period: May 29, 1985 - June 30, 1985	USRA8-36400 QR1
	Space Station Prototype CMG Monthly Progress Report Thru June 30, 1985 Attachment J-2, A	BENDIX8-36628 PR1
85/07/01	Adaptive Rigid Body Control for An Evolving Space Station Monthly Report July 1985	FACC8-36422 PR2
	Ground Test Article for Deployable Space Structure Systems Eighth Bi-Monthly Report	RIC8-34657 BMR8
	Integrated Wall Design and Penetration Damage Control Monthly Progress Report No. 1 Covering Period 3 June to 30 June 1985	BAC8-36426 PR1
	NASA Technical Memorandum Deployable/Erectable Trade Study for Space Station Truss Structures Preliminary	NASA TM-87573
	Space Station ECLSS Integration Analysis Monthly Progress Report for June 1985	ECLS R0002
85/07/02	Advanced Development Plan DR-05	D483-50002-1
	Transmittal of Data in Support of Level B Engineering Master Schedule Milestones	KC2-85L-50
	Work Package Data Request Supporting Level B EMS Item R2.2.1 and R3.2.1	KC2-85L-52
85/07/06	Man-Tended Approach Reference Configuration	JSC-03211
	Man-Tended Approach Study Management Plan	JSC-30210
85/07/08	Space Station Structures Development Monthly Report - June 1985	RIC8-36421 MR1

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85/07/08	Space Station Trace Containment Control Monthly Progress Report for June 1985	LMSC/D962195
85/07/09	RUR 1 Presentation Canadian Reference Configuration	SS-RUR1-CRC
85/07/10	Space Station Body Mounted Radiator Systems Progress Report No. 2	3-14000/5R-3
85/07/11	Space Station Plume Impingement and Contamination Monthly Progress Report June 1985	LMSC-F042511
85/07/12	Space Station Definition and Preliminary Design, WP-01 Project Management Review	SSP-MMC-0010
	Space Station Project Review Documentation	BAC8-36526PMR
85/07/15	Contract NAS8-36526	2-8291-0000-036
	Space Station Definition and Preliminary Design, WP-01 Monthly Status Report Issue 2 Period Covered: June 1, 1985 through June 30, 1985	SSP-MMC-00006
	Space Station Electro-Optical Sensor Assembly Monthly Progress Report Number One For Period Ending June 30, 1985	BASD8-36627 PR1
	Space Station Thermal Storage/Refrigeration System Research and Development Monthly Progress Report Report Period: June 1985	LMSC-F042518
		LMSC-F042518
85/07/16	Space Station Management Plan-WP-01 DR-01 Draft	D483-50001-1
85/07/18	Reference Update Review (RUR-1) MSFC Integration	MSFC-RUR-1-INT
	Space Station Long Life Fluid System First Monthly Progress Report MPR-1 Reporting Period May 20, 1985 to July 1, 1985	HS8-36626 MPR1
85/07/19	Japanese Technical Coordination Sheets	SU-285010A
	Space Station Definition and Preliminary Design Work Package 3 EMS Deliverables	GEEMS-RUR1AP

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85/07/19	RUR-1 Code AP: Attached Payload Accommodations	GEEMS-RUR1AR
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		GEEMS-RUR1PL
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	Space Station Definition and Preliminary Design WP-04 Electrical Power System	45300.101-001
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85/07/20	Advanced Planar Array Development for Space Station Monthly Progress Report #1 June 1985	LMSC-D973457
85/07/22	Monthly Progress Report for Space Station Common Module Audio Distribution System Laboratory Demonstration	HAC8-36430 PR1
		HAC8-36430 PR1
85/07/25	"Strawman" Space Station Program Payload Management Plan	O CJ8-36404 7-85/1
	EMS Product GSFC - WP-3	EMS C6.3.1
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85/07/25	Management Philosophy Checklists	OCJ8-36404 7-85/3
	Periodic Progress Review Meeting Documentation Quarterly Report, Period ATP to July 25, 1985 Contract NAS8-36404, User Operations Management	OCJ8-36404 7-85
85/07/26	Customer Ground Processing Analyses	EMS-CGPA-R5.K.1
	EMS Product GSFC - WP-3	EMS R3.3.1
	Japanese Experiment Module Reference Configuration Description	SU-285018
	Space Station Common Module Configuration Data Book	SS-RP-100
	Space Station Integration Configuration Data Book	SS-RP-900
	Space Station Logistics Module Configuration Data Book	SS-RP-300
	Space Station Manufacturing and Technology Laboratory Configuration Data Book	SS-RP-200
	Space Station Propulsion Configuration Data Book	SS-RP-700
	Space Station Vehicle Accommodations Configuration Data Book	SS-RP-400
	Work Package 2 Space Station Projects EMS Data Package (Phase B)	WP2-EMS-DP
85/07/30	Articulated Coarse Pointing System Requirements	JSC-SS-ACPSR
85/07/31	EMS Data Transmittal	8400-0104G
	Research Study: Space Station Natural Environment Design Criteria Studies Monthly Progress Report Reporting Period: July 1, 1985 - July 31, 1985	USRA8-36400 PR1
85/07/85	Space Station Propulsion Technology Monthly Status Report 24 May 1985 - 30 June 1985	85RC10246
85/08/01	EMS Product GSFC - WP-3	EMS R1.3.3

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85/08/01	Engineering Master Schedule (EMS) Synthesized Data	EL-13591
	Integrated Wall Design and Penetration Design Control Monthly Progress Report No. 2 Covering Period 1 July to 31 July 1985	BAC8-36426 PR2
	Space Station Data System Analysis/Architecture Study Task 1- Functional Requirements Definition DR-5 Appendix- Requirements Data Base	MDC-1343
	Space Station Data System Analysis/Architecture Study Task 3- Trade Studies, DR-5	MDC-H1943
	Space Station Definition and Preliminary Design Work Package 2 Time- Phased SE&I Study Products (DR-19, Data Package 2.2)	MDC-H1995
	Space Station ECLSS Integration Analysis Monthly Progress Report for July 1985	MDC W5039-3
	Space Station ECLSS Integration Analysis Simplified General Cluster Systems Model ECLS System Assessment Program Enhancements	MDC W5040
	Space Station Protective Coatings Development Combined Monthly Technical Progress Report for the Periods 6/10/85 to 7/10/85, and 7/10/85 to 8/10/85	BAC8-36586 TPR1
85/08/02	Monthly Progress Report for Space Station Rotary Joint Mechanisms Test Bed/Operations for July 1985	CE8-36585 PR2
85/08/05	Development of Structural Dynamic Analysis Tools Monthly Progress Report No. 1 6/5/85 - 8/5/85	BAC8-36420 PR1
	Monthly Progress Report and Data Requirement MP-6, Financial Management Report	CO-3 001
	Space Station Plume Impingement and Contamination Monthly Progress Report July 1985	LMSC-F042542
85/08/06	Space Station Body Mounted Radiator Systems Progress Report No. 3	3-14000/5R-7

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85/08/08	Space Station Trace Contaminant Control Monthly Progress Report for July 1985	LMSC/F071300
85/08/09	Space Station Structures Development Monthly Report - July 1985	RIC8-36421 MR2
85/08/12	Space Station Data Management Network Components Monthly Progress Report Period: July 1985	CC8-36411 PR2
85/08/13	Contract NAS8-36526, Data Requirement 14 - Monthly Status Report	2-8291-0020-046
	Space Station Definition and Preliminary Design/Work Package 03 Management Plan DR-01 (Update)	RCA-DR01-1
		WP3-MP-2613798
85/08/14	Data Requirement MP-5, Monthly Progress Report and Data Requirement MP-6, Financial Management Report	CO-3 002
85/08/15	Space Station Definition and Preliminary Design, WP-01 Monthly Status Report Issue 3	SSP-MMC-00006
	Space Station Thermal Storage/Refrigeration System Research and Development Monthly Progress Report Report Period: July 1985	LMSC-F042559
	Work Package 2 Space Station Projects Engineering Master Schedule	WP2-SSP-EMS
85/08/16	Monthly Progress Report (July 1 through July 31, 1985) on Space Station Long-Term Lubrication Analysis NAS8-36655	BCD8-36655 PR1
	Space Station Definition and Preliminary Design, WP-01 Quarterly Management Review	SSP-MMC-00011
	Space Station Project Review Documentation	BAC8-36526 PRD

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85/08/16	Space Station Projects Quarterly Review Project Overview	SS-PQR-PO-8/85
	Space Station Propulsion Technology Monthly Status Report 2 29 June 1985 - 02 August 1985	85RC11633
	Space Station Work Package 2 Advanced Development Algorithms Definition and Analysis Report Project 21. Integrated Proximity Operations Software	SSS85-0050
	Space Station Work Package 2 Definition and Preliminary Design Phase Time-Phased SE&I Study Products Data Package 2.2 Volume I	SSS85-0052
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85/08/19	Space Station Long Life Fluid System Submittal of Second Monthly Progress Report July 1, 1985 to August 1, 1985	HS8-36626 MPR2
85/08/21	GE/TRW WP-3 Monthly Status Meeting	GE-MSM-850821
		GSFC-WP3-MSM
85/08/25	Space Station Work Package 2 Definition and Preliminary Design Phase Time-Phased SE&I Study Products EMS Data Data Package 2.2A	SSS85-0097
85/08/26	Work Package 2 Space Station Projects EMS Data Package Data Input Requirements	WP2-EMS-DIR-8/85
85/08/28	Space Station Work Package 2 Definition and Preliminary Design Phase Time-Phased SE&I Study Products EMS Data Data Package 2.1A	SSS85-0096
85/08/29	Level B EMS Drop Additional Data	PB3-85-096L
	Space Station Prototype CMG Monthly Progress Report July 1 thru August 31, 1985 Attachment J-2, A	BENDIX8-36628 PR2
85/08/30	Monthly Progress Report for July 1985 Space Station Common Module Audio Distribution System Laboratory Demonstration	HAC8-36430 PR2

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85/08/30	Space Station Work Package 3 Definition and Preliminary Design Management Plan DR-01 Revision A	GE/TRW-DR01
85/08/31	Progress Report for Period Aug 1 thru Aug 31, 1985 for Space Station Common Module Power System Network Topology & Hardware Development Program	MCR-85-618-3
	Research Study: Space Station Natural Environment Design Criteria Studies Monthly Progress Report Reporting Period: August 1, 1985 - August 31, 1985	USRA8-36400 PR2
85/09/01	Ground Test Article for Deployable Space Structure Systems Ninth Bi-Monthly Report	RIC8-34657 BMR9
	Space Station Definition and Preliminary Design Time-Phased SE&I Study Products: Data Package 2.3 (DR-19) Book 1 (Sections 1.0 thru 2.4)	MDC-H2002
	Space Station Definition and Preliminary Design Work Package 2 Man- Tended Approach- Configuration Definition	MDC-H2001
	Space Station Definition and Preliminary Design Work Package 2 Management Plan (DR-01)	MDC-H1407A
	Space Station Definition and Preliminary Design Work Package 2 Time- Phased SE&I Study Products (DR-19, Data Package 2.2A)	MDC-H1995
		MDC-H2002
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		MDC-H2002
	Space Station Definition and Preliminary Design Work Package No. 2 CMR Review Documentation	MDC-H2004
	Space Station ECLSS Integration Analysis Detailed Cluster Consumables Model	MDC W5055-1
	Space Station ECLSS Integration Analysis Monthly Progress Report for August 1985	MDC W5039-4

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85/09/01	Space Station ECLSS Integration Analysis Simplified General Cluster Systems Model ECLS System Assessment Program Enhancements	MDC W5040-2
	Space Station Protective Coatings Development Combined Monthly Technical Progress Report For the Periods 8/10/85 to 9/10/85 and 9/10/85 to 10/10	BAC8-36586 TPR2
85/09/02	Integrated Wall Design and Penetration Damage Control Monthly Progress Report No. 3 Covering Period 1 August to 31 August 1985	BAC8-36426 PR3
	Space Station Definition and Preliminary Design Work Package 03 Engineering Master Schedule Data Package Volume 2 Configuration	RCA-EMS9-2
85/09/04	Space Station Program Mass Properties Report	D483-50037-1
85/09/05	Development of Structural Dynamic Analysis Tools Monthly Progress Report No.2 8/6/85 - 9/5/85	BAC8-36420 PR2
	Space Station Plume Impingement and Contamination Monthly Progress Report August 1985	LMSC-F042572
85/09/06	RUR2-6 EMS Data: LeRC WP-04 EMS Theme: STS Performance Capabilities and Space Station Implications	RUR2-6EMS-R1.4.3
	Space Station Definition and Preliminary Design Work Package 03 Engineering Master Schedule Data Package Volume 1 Requirements Book I (R1 & R2)	RCA-EMS9-1-1
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85/09/06	Space Station Electro-Optical Sensor Assembly Monthly Progress Report for Period Ending 31 July 1985	BASD8-36627 PR2
	Space Station Structures Development Monthly Report - August 1985	RIC8-36421 MR3
	Space Station Work Package 2 Definition and Prelim Design Phase EMS Data DP2.2B S6209.2,Ground v.Orbit Checkout Trades Prelim Ground v. On-Orbit Results	SSS85-0117
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.2B S5205.2 Fault Tolerance/Maintainability Analysis	SSS85-0053
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	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data DP 2.2B S6207.2, Bite & Instrumentation Analysis "Interim Update Bite/Data"	SSS85-0115
		SSS85-0138
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Package 2.2B R1203.2 Alternate Module Outfitting Approach	SSS85-0139
	Space Station Work Package Definition and Preliminary Design Phase EMS Data Package 2.2B S5200.2, Maintainability Methodology Definition	SSS85-0106
85/09/08	Space Station Trace Contaminant Control Monthly Progress Report for August 1985	LMSC/F071306

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85/09/09	Monthly Progress Report for August 1985 Space Station Common Module Audio Distribution System Laboratory Demonstration	HAC8-36439 PR3
	Monthly Progress Report for Space Station Rotary Joint Mechanisms Test Bed/Operations for August 1985	CE8-36585 PR3
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.1A C3204.1, Number of Modules Analysis	SSS85-0145
		SSS85-0146
85/09/10	Space Station Data Management Network Components Monthly Progress Report Period: August 1985	CC8-36411 PR3
85/09/11	Data Requirement MP-5, Monthly Progress Report and Data Requirement MP-6, Financial Management Report	CO-3 003
	Space Station ACS Test Bed Modification and Refurbishment of Skylab's CMG's and Related Equipment Monthly Progress Report July 1 thru August 31, 1985	BENDIX8-36408 PR3
	Space Station Project Review Document	BAC8-36526 PRD9/85
85/09/12	Monthly Progress Report (August 1 through August 31, 1985) on Space Station Long-Term Lubrication Analysis NAS8-36655	BCD8-36655 PR2
	Space Station Definition and Preliminary Design, WP-01 Project Management Review	SSP-MMC-00013
	Space Station Work Package 2 Definition and Preliminary Design Phase Contractor Management Review CMR No. 3 Monthly Status Report	SS85-75
85/09/13	Data Requirement 14 - Monthly Status Report	2-8291-0020-053
	Space Station Definition and Preliminary Design, WP-01 EMS Theme Data RUR-2 Data Package 1.2 Volume 1 Requirements	SSP-MMC-00012
		SSP-MMC-00012

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85/09/13	Space Station Definition and Preliminary	SSP-MMC-00012
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	Space Station Definition and Preliminary Design, WP-01 End Item Data Book RUR-2 Data Package 1.2 Book 1 Space Station Systems	SSP-MMC-00012
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	Space Station Definition and Preliminary Design, WP-01 Executive Summary RUR-2 Data Package 1.2	SSP-MMC-00012
	Space Station Definition and Preliminary Design, WP-01 Quarterly Management Review	SSP-MMC-00017
	Space Station Propulsion Technology Monthly Status Report 3 03 August 1985 - 30 August 1985	85RC13231
	Time Phase SE&I Study Products-WP01 DR-19 Data Package 1.2 EMS Theme Data Requirements Volume 1	D483-50021
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85/09/15	Space Station Definition and Preliminary Design, WP-01	SSP-MMC-00006
	Space Station Definition and Preliminary Design, WP-01 Monthly Status Report Issue 4 Period Covered 1 August 1985 through 31 August 1985	SSP-MMC-00006

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85/09/16	Adaptive Rigid Body Control for an Evolving Space Station Monthly Progress Report August 1985	FACC8-36422 PR2
	Solar Terrestrial Observatory Monthly Report #1	TRW8-36603 MR1
	Space Station Long Life Fluid System Submittal of Third Monthly Progress Report August 1, 1985 to September 1, 1985	HS8-36626 MPR3
85/09/18	Automation Study for Space Station Subsystems and Mission Ground Support Final Report	HAC-82-14F FR
85/09/20	EMS Product GSFC - WP-3	EMS R3.3.1
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	EMS Product GSFC - WP-3 Integration Assessment	WP3-EMS-C1.3.2
	RUR2-4 EMS Data LeRC WP-04 EMS Theme: Function Allocation	RUR2-4EMS-C6.4.2
		RUR2-4EMS-C6.4.3
	RUR2-4 EMS Data: LeRC WP-04 EMS Theme: Architectural Concepts	RUR2-4EMS-C1.4.2
		RUR2-4EMS-C1.4.3
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	RUR2-4 EMS Data: LeRC WP-04 EMS Theme: Space Station Operations Requirements	RUR2-4EMS-R2.4.1
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	RUR2-4 EMS Data: LeRC WP-04 EMS Theme: STS Performance Capabilities and Space Station Implications	RUR2-4EMS-R1.4.1
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	RUR2-4 EMS Data: LeRC WP-04 EMS Theme: Verification and Checkout	RUR2-4EMS-S6.4.1
	RUR2-4 EMS Theme: Resource Requirements	RUR2-4EMS-R3.4.2
	Space Station Work Package 2 Advanced Development Data Base Format Report	SSS85-0082

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85/09/20	Project 28. EVA Systems	
	Space Station Work Package 2 Advanced Development Design and Construction of Scale Models of Habitat Module Report	SSS85-0083
	Project 30. Manned Space Habitability	
	Space Station Work Package 2 Definition and Preliminary Design Phase Operations Planning Appendix C: On-Orbit Maintenance Plan	SSS85-0208
	Space Station Work Package 2 Definition and Preliminary Design Phase Time-Phased SE&I Study Products Data Package 2.3 Volume I	SSS85-0162
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85/09/26	Space Station Body Mounted Radiator Systems Progress Report No. 4	3-14000/5R-678
	Space Station Definition and Preliminary Design Work Package 03 Project Management Review No. 3 (DR-13)	RCA-DR13-3
	WP-3 Monthly Status Review Meeting	GSFC-WP3-MSRM
85/09/30	EMS Data: LeRC WP-04 EMS Theme: Safety	RUR2-4EMS-R6.4.1
	LeRC WP-04 EMS Theme: Safety	RUR2-4EMS-R6.4.1
	Research Study: Space Station Natural Environment Design Criteria Studies Monthly Progress Report Reporting Period: Sept. 1, 1985 - Sept. 30, 1985	USRA8-36400 PR3
85/10/01	Development Plan for a Space Station Common Module Audio Distribution Development System	HAC8-36430 DP
	EMS Dictionary	EMS-DICTIONARY
	EMS Product GSFC - WP-3	WP3-EMS-R6.3.1
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		WP3-EMS-R6.3.6
	Ground Test Article for Deployable Space Structure Systems Final Report	SSS 85-0164
	Integrated Wall Design and Penetration Damage Control Monthly Progress Report No. 4 Covering Period 2 September to 30 September 1985	BAC8-36426 PR4
	Progress Report for Period Sept 1 thru Sept 30, 1985 for Space Station Common Module Power System Network Topology & Hardware Development Program	MCR-85-618-4
	Space Station Definition and Preliminary Design Work Package 2 Advanced Development Task Report: Thermal Utility Bus Control Requirements	MDC-02-300-20-07
		MDC-02-300-20-16
	Space Station Definition and Preliminary Design Work Package No. 2 Time- Phased SE&I Study Products: DP 2.3A (DR-19) Book 1 EMS Data	MDC-H2010
		MDC-H2010
	Space Station ECLSS Integration Analysis Monthly Progress Report for September 1985	MDC W5039-5
	Space Station Long Life Fluid Systems Fourth Monthly Progress Report Reporting Period September 1, 1985 to October 1, 1985	HS8-36626 MPR4
	System Analysis Study of Space Platform & Station Accommodations for Life Sciences Research Facilities Final Report Vol.I Conceptual Design/Programmatics	D180-27863-1
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85/10/02	Monthly Progress Report for Space Station Rotary Joint Mechanisms Test	CE8-36585 PR4

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85/10/02	Bed/Operations for September 1985	
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	Space Station Trace Contaminant Control Monthly Progress Report for September 1985	LMSC/F071313
85/10/04	Data Requirement MP-5, Monthly Progress Report and Data Requirement MP-6, Financial Management Report	CO-3 004
	R3.3.1 Provide Resource Requirements SPECIAL	RCA-EMS-R3.3.1
	Space Station Customer Ground Processing Analysis Facilities Requirements Report Station Accomodation Test Sets	R5.K.1
	Space Station Definition and Preliminary Design Work Package 03 Engineering Master Schedule Data Package Volume 1 SE&I Overview	RCA-EMS10
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	Space Station Definition and Preliminary Design Work Package 3 EMS Deliverables RUR-2 Volume 1 Requirements	GE/TRW RUR-2
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	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data DP 2.3A S1202.2, Analyze Advanced Development Activity For IOC Application	SSS85-0167
85/10/06	Space Station Plume Impingement and Contamination Monthly Progress Report September 1985	LMSC-F042648
85/10/07	Space Station Data Management Network Components Monthly Progress Report Period: June 1985	CC8-36411 PR1
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.3A S4205.2, Define Functional Commonality Candidates	SSS85-0148
		SSS85-0149
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	Work Package 2 Space Station Projects EMS Data Package Book 1	WP2-EMS-DP-1-10/85
	Work Package 2 Space Station Projects EMS Data Package Book II	WP2-EMS-DP-2-10/85
85/10/08	Solar Alpha Joint Design Progress Report for September 1985	SPERRY8-36415 PR3
	Space Station Logistics Simulation and Data Base Development Periodic Program Review Meeting Documentation	LOG-MMC-00008
	Space Station Power Electronics Capacitor Development Progress Report for Period Ending July 31, 1985	SEC8-36437 PR1
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	Space Station Reference Update Review (RUR-2) Work Package 01 MSFC October 8, 1985 Volume I	EL-13591
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	Space Station Work Package 2 Definition	SSS85-0126

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85/10/09	Space Station Structures Development Monthly Report September 1985	RIC8-36421 MR4
85/10/10	Atomic Oxygen Simulation System Progress Report For the Period September 11 through October 10, 1985	MCR-85-646-4
	Solar Terrestrial Observatory Monthly Report #2	TRW8-36603 MR2
	Space Station Data Management Network Components Monthly Progress Report Period: September 1985	CC8-36411 PR4
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.3A C3202.2, Airlock Location Analysis	SSS85-0152
85/10/11	Space Station Propulsion Technology Monthly Status Report 4 31 August 1985 - 27 September 1985	85RC14541
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.3A R5203.2, Pointing Requirements Analysis	SSS85-0153
	Space Station Work Package Definition and Preliminary Design Phase EMS Data Data Package 2.3A C2203.1, Scar Definition	SSS85-0150
	System Operations Scenarios	COL-RP-ER-0015
85/10/15	Adaptive Rigid Body Control for an Evolving Space Station Study Plan and Preliminary Analysis Report	WDL-TR10569
	Monthly Progress Report (September 1, through September 30, 1985) on Space Station Long-Term Lubrication Analysis NAS8-36655	BCD8-36655 PR3
	Space Station ACS Test Bed Modification and Refurbishment of Skylab's CMG's and Related Equipment Monthly Progress Report September 1985	BENDIX8-36408 PR4

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	Space Station Program Definition and Requirements	JSC-30000
85/10/16	EMS Product GSFC - WP-3	WP3-EMS-S1.3.2
	Space Station Thermal Storage/Refrigeration System Research and Development Monthly Progress Report Period: September 1985	LMSC-F042633
85/10/18	AC Power Processing Breadboard Monthly Progress Report June 1985	GD8-36429 PR1
	Advanced Planar Array Development for Space Station Monthly Progress Report #3 August-September 1985	LMSC-D973462
	Columbus Reference Configuration Report	COL-RP-ER-0014
	Columbus to US Space Station Interface Control Document	COL-ICD-ER-0001
		ESA-RUR2-DD-S04-5
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	NASDA/NASA Technical Interface Coordination Sheet Prepared as Data Package Based on EMS for RUR-2 and Technical Coordination	SU-285010B
	Work Package 3 Space Station Project EMS Data Package RUR 2	GSFC400.6#00104
85/10/21	Contract Progress Report, Contract NAS8-36629, Orbital Equipment Transfer Techniques	ESSEX8-36629 PR3
	Intelligent Robotic Systems Study Progress Report Report Period September 1, 1985 through October 4, 1985	MCR-85-654-3
85/10/23	Space Station Program Canadian Reference Configuration Level B Description Integrated Servicing and Test Facility (ISTF)	ISTF-CRC-10/85
85/10/24	Monthly Progress Report for September 1985 Space Station Common Module Audio Distribution System Laboratory Demonstration	HAC8-36430 PR4
85/10/25	Canada Requirements Update Review No. 2 Data Package Integrated Servicing and Test Facility	NRC-SS002
85/10/28	Adaptive Rigid Body Control for an Evolving Space Station Monthly Progress Report September 1985	FACC8-36422 PR3
	Customer Ground Processing Analyses	EMS-CGPA-R5.K.1
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	Space Station Customer Ground Processing Analysis Facilities Requirements Report Station Accommodation Test Sets	EMS-FRR/SAT R5.K.1
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85/10/29	Engineering Master Schedule	JSC-30208
85/10/30	Columbus System Requirements Report	COL-RP-ER-0006

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85/10/31	Progress Report for Period Oct 1 thru Oct 31, 1985 for Space Station Common Module Power System Network Topology and Hardware Development Program	MCR-85-618-5
	Refurbishment of Three Axis Attitude Motion Simulator Monthly Activity Report of Contract NAS8-36409 No. 3 For Period Ending 31 October 1985	SC8-36409 PR3
	Research Study: Space Station Natural Environment Design Criteria Studies Monthly Progress Report Reporting Period: Oct. 1, 1985 - Oct. 31, 1985	USRA8-36400 PR4
85/11/01	Integrated Wall Design and Penetration Damage Control Monthly Progress Report No. 5 Covering Period 1 October 1985 to 31 October 1985	BAC8-36426 PR5
	NASA Technical Memorandum The MSFC/J70 Orbital Atmosphere Model and the Data Bases for the MSFC Solar Activity Prediction Technique	NASA TM-86522
	RUR2 EMS Data: LeRC WP-04 EMS Theme: Strategy 2 Automation and Robotics	RUR2-EMS-WP4
	Space Station Definition and Preliminary Design Work Package 2 Advanced Development Project 9, Task 2 Clothes Washer/Dryer Concepts Development Report	MDC-02-300-20-09
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		MDC-02-300-20-19
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85/11/01	Space Station Definition and Preliminary	MDC-H2025
	Space Station ECLSS Integration Analysis	MDC W5039-6
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	Space Station ECLSS Integration Analysis	MDC W5061-1
	Space Station Cluster Closed Loop Oxygen	
	Recovery Models-Oxygen Generation	
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	Water Recovery Model	
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	Space Station Power Electronics Capacitor Development Progress Report for Period Ending October 1985	SEC8-36437 PR4
85/11/07	Contract Progress Report, Contract NAS8-36629, Orbital Equipment Transfer Techniques	ESSEX8-36629 PR3
85/11/08	Advanced Orbital Servicing Technology Monthly Progress Report (Covering 30 Sept. to 31 Oct. 1985)	SA-AOST-RP-05
	Advanced Planar Array Development for Space Station Monthly Progress Report #4 October 1985	LMSC-D973466
	Contract NAS8-36526 (Data Requirement 02 - Preliminary Analysis and Design Document - Review Evaluation of J8400001, S.O.W. 3.7.1	2-8180-JCT-052
	Space Station Structures Development Monthly Report October 1985	RIC8-36421 MR5
85/11/10	Atomic Oxygen Simulation System Progress Report For the Period October 11 through November 10, 1985	MCR-85-646-5
	Solar Terrestrial Observatory Monthly Report #3	TRW8-36603 MR3
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85/11/11	Space Station Data Management Network Components Monthly Progress Report Period: October 1985	CC8-36411 PR5
85/11/12	AC Power Processing Breadboard Monthly Progress Report October 1985	GD8-36429 PR2
	Data Requirement MP-5, Monthly Progress Report and Data Requirement MP-6, Financial Management Report	CO-3 005
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85/11/12	Air Revitalization System Monthly Progress Report No.3 Covering Period October 1 through October 31, 1985	
	Space Station Body Mounted Radiator Systems Progress Report No. 6	3-14000/5R-25
		3-14000/5R-25
85/11/13	Monthly Progress Report (October 1, through October 31, 1985) on Space Station Long-Term Lubrication Analysis NAS8-36655	BCD8-36655 PR4
	Space Station Long Life Fluid Systems Fifth Monthly Progress Report Reporting Period October 1, 1985 to November 1, 1985	HS8-36626 MPR5
	Space Station Project Review Documentation	BAC8-36526PMR
85/11/15	Berthing Mechanisms Monthly Progress Report for October 1985	MDC8-36417 PR5
	Contract NAS8-36526, Data Requirement 14 - Monthly Status Report	2-8166-CGH-003
	Space Station ACS Test Bed Modification and Refurbishment of Skylab's CMG's and Related Equipment Monthly Progress Report October 1985	BENDIX8-36408 PR5
	Space Station Definition and Preliminary Design, WP-01 Monthly Status Report Issue 6 Period Covered 1 October 1985 through 31 October 1985	SSP-MMC-00006
	Space Station Propulsio Technology Monthly Status Report 5 28 September 1985 - 01 November 1985	85RC17216
	Space Station Thermal Storage/Refrigeration System Research and Development Monthly Progress Report Report Period: October 1985	LMSC-F042708
85/11/17	Space Station Definition and Preliminary Design, WP-01 Product Assurance Requirements Review	SSP-MMC-00018
85/11/18	KSC Analysis of Ground Accommodations	EMS-S3.K.1/S.7.K 2

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	Space Station Logistics Simulation and Data Base Development Inventory Management Plan	LOG-MMC-00003
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.3A C2202.2, Growth Increments and Limits Definition	SSS85-0186
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Package 2.3A C2201.2, Growth Requirements and Concepts Analysis	SSS85-0185
85/11/19	Space Station Definition and Preliminary Design Work Package 3 Preliminary Analysis and Design Document DR-02 Section 9	GE/TRW DR02 (S9)
85/11/22	Space Station Work Package 2 Advanced Development Non-Contact and Multi- User Interface Report Projects 32 & 33	SSS85-0180
	Space Station, Automation of Common Module Power Management and Distribution Progress Report June 25, 1985 through October 31, 1985	MCR-85-706 1-5
85/11/25	Intelligent Robotic Systems Study Progress Report Report Period October 5, 1985 through November 3, 1985	MCR-85-654-4
85/11/26	Data Requirement 10 - Program Implementation Plan, Applicable Document Review	2-8293-0000-021
	Space Station Work Package 2 Definition and Preliminary Design Phase Preliminary Failure Mode Effects Analysis Report	SSS85-0169
85/11/27	Development of Structural Dynamic Analysis Tools Monthly Progress Report No. 3 9/5/85 - 11/5/85	BAC8-36420 PR3
85/11/30	Progress Report for Period Nov 1 thru	MCR-85-618-6

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	Research Study: Space Station Natural Environment Design Criteria Studies Monthly Progress Report Reporting Period: Nov. 1, 1985 - Nov. 30, 1985	USRA8-36400 PR5
85/12/01	Adaptive Rigid Body Control for an Evolving Space Station Monthly Progress Report December 1985	FACC8-36422 PR6
	Space Station Definition & Preliminary Design Work Package 2 Adv Dev Proj 18, Task 1 High Speed Communications Distribution Network Design and Development	MDC-ADP18-01
	Space Station Definition & Preliminary Design Work Package No.2 Advanced Development Project 1, Task 5 Fault-Tolerance Distributed NOS Requirements	MDC-ADP01-05
	Space Station Definition and Preliminary Design Work Package 2 Adv Dev Project 11, Tasks 5/6 OMIS Equipment Zero Gravity Suitability	MDC-ADP11-05/06
	Space Station Definition and Preliminary Design Work Package 3 DR-06 Appendices	GE/TRW-DR06
	Space Station Definition and Preliminary Design Work Package 3 Project Implementation Plan DR-10 International System of Units Impact Study	GE/TRW DR10-001
		GE/TRW DR10-003
	Space Station Definition and Preliminary Design Work Package No. 2 Adv Dev Project 1, Task 6 Fault Tolerant Distributed NOS, Current Approaches	MDC-ADP01-06
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	Space Station Definition and Preliminary Design Work Package No. 2 Adv Development Project 3, Task 1	MDC-ADP03-01

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85/12/01	Knowledge-Based Maintenance Sys Subsystem Selection	
	Space Station Definition and Preliminary Design Work Package No. 2 Advanced Development Project 02, Task 2 Analyze Shuttle Environment	MDC-ADP02-02
	Space Station Definition and Preliminary Design Work Package No. 2 Customer Accommodations (DR-06)	MDC-H2046
		MDC-H2046
	Space Station Definition and Preliminary Design Work Package No. 2 Prelim Analysis & Design Document (DR-02) Book 10 Mechanical Systems (Section 4.7)	MDC-2028
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	Space Station Definition and Preliminary Design Work Package No. 2 Systems Test and Verification Plan (DR-04)	MDC-H2027
	Space Station Definition and Preliminary Design Work Package No. 2 Time- Phased SE&I Study Product: Data Package 2.4B (DR-19) EMS Data	MDC-H2044
	Space Station Definition and Preliminary Design Work Package No.2 Project Implementation Plan (DR-10) Book 2 Internat'l Sys of Units Impact Study Report	MDC-H2288
	Space Station ECLSS Integration Analysis Monthly Progress Report for November 1985	MDC W5039-7
	Space Station Hatch Study First Edition	JSC-32002
	Space Station Viewport Study First Edition	JSC-32003
	Space Station WP-04 Power System Preliminary Failure Modes and Effects Analysis DR12	RI/RD85-302
	Space Station, Automation of Common Module Power Management and Distribution Progress Report November 1, 1985 through November 30, 1985	MCR-85-706-6
	System/Subsystem Requirements (Draft) of The Japanese Experiment Module for Phase B Study	SU-84032A
85/12/02	Space Station Integrated Wall Design and Penetration Damage Control Monthly Progress Report No. 6 Covering Period 1 November to 30 November 1985	BAC8-36426 PR6
85/12/03	November 1985 Monthly Progress Report for the Non-Contacting Slip Ring Program	SEOI8-36416 PR7
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85/12/04	Space Station Trace Contaminant Control Monthly Progress Report for November 1985	
85/12/04	Space Station Plume Impingement and Contamination Monthly Progress Report November 1985	LMSC-F042726
85/12/05	Monthly Progress Report for Space Station Rotary Joint Mechanisms Test Bed/Operations	CE8-36585 PR6
	Space Station WP-04 Power System Customer Accommodations DR-06	RI/RD85-310
	Space Station WP-04 Power System Software Development Test and Verification Plan DR-16	RI/RD85-311
85/12/06	Metric Standards Usage Study Space Station Program WP 01	D483-50035-1
	Solar Alpha Joint Design Progress Report for October and November	SPERRY8-36415 PR3
	Space Station Definition and Preliminary Design Work Package 3 Time Phased SE&I Study Products DR-19 Volume I Requirements	GE/TRW-DR19-DP3.3 GE/TRW-DR19-DP3.3

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	Space Station Orbital Operations Plan WP 01	D483-50052-3
	Space Station Prelaunch Operations Plan WP 01	D483-50052-2
	Space Station Program Office Advanced Automation and Robotics Data Products Report for Requirement Update Review - Two	JSC-B-RUR2
	Space Station Prototype CMG Monthly Progress Report November 1985 Attachment J-2, A	BENDIX8-36628 PR4
	Space Station Work Package 2 Definition and Preliminary Design Phase Communications and Tracking Report Volume I	SSS85-0191
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	Space Station Work Package 2 Definition and Preliminary Design Phase Data Management System Report	SSS85-0195
	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Data Package 2.3A R1205.2, PIP Preparation	SSS85-0192
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	Space Station Work Package 2 Definition and Preliminary Design Phase EMS Data Package 2.4A C4202.3, Attached Payloads Accommodation Definition	SSS85-0198
	Space Station Work Package 2 Definition and Preliminary Design Phase Preliminary Analysis and Design Report Volume II	SSS-0188
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	Space Station Work Package 2 Definition and Preliminary Design Phase Space Station Information System (SSIS) Report Volume II	SSS85-0189
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85/12/08	Space Station Protective Coatings Development Monthly Technical Progress Report for the Period 10/10/85 to 11/10/85	BAC8-36586 TPR3
85/12/09	Space Station Structures Development Monthly Report November 1985	RIC8-36421 MR6
85/12/10	Atomic Oxygen Simulation System Progress Report For the Period November 11 through December 10, 1985	MCR-85-646-6

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85/12/10	Monthly Progress Report (November 1, through November 30, 1985) on Space Station Long-Term Lubrication Analysis NAS8-36655	BCD8-36655 PR5
	Refurbishment of Three Axis Attitude Motion Simulator Monthly Activity Report of Contract NAS8-36409 No.4 for Period Ending 30 November 1985	SC8-36409 PR4
	Space Station Definition and Preliminary Design Work Package No. 2 10 December 1985 Contract Management Review Documentation	MDC-H2038
	Space Station Power Electronics Capacitor Development Progress Report for Period Ending November 1985	SEC8-36437 PR5
	Space Station WP-04 Power System Project Implementation Plan DR10	RI/RD85-309
85/12/11	Data Requirement 02, Item 13.2.1, Recommended Changes to NASA Mission, Operations and Systems Requirements	2-8293-0000-026
	Space Station Definition and Preliminary Design, WP-01 Project Management Review	SSP-MMC-00034
	Space Station Project Review Documentation	BAC8-36526PMR 12/85
85/12/12	Space Station Propulsion Technology Monthly Status Report 6 02 November 1985 - 29 November 1985	85RC18345
85/12/13	Contract NAS8-36526, Data Requirement 14 - Monthly Status Report	2-8166-CGH-007
	Space Station Thermal Storage/Refrigeration System Research and Development Monthly Progress Report Report Period: November 1985	LMSC-F042740
	Specifications and Standards Approved Baseline List	J8400088
85/12/15	Space Station Definition and Preliminary Design, WP-01 Monthly Status Report Issue 7 Period Covered: 1 November 1985 through 30 November 1985	SSP-MMC-00006

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85/12/16	Berthing Mechanisms Monthly Progress Report for November 1985	MDC8-36417 PR6
	Space Station Body Mounted Radiator Systems Progress Report No. 7	3-14000/5R-54
	Space Station WP-04 Power System Preliminary Analysis and Design Document DR-02	RI/RD85-320
	Space Station WP-04 Power System Preliminary Automation and Robotics Plan DR-17	RI/RD85-319
85/12/18	Advanced Planar Array Development for Space Station Monthly Progress Report #4 November 1985	LMSC-D973475
	IRR-4 EMS Data: LeRC WP-04 EMS Theme: Strategy 5 Maintainability	IRR4EMS-STRAT.5
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	Space Station Definition and Preliminary Design, WP-01 Applicable Documents Review	SSP-MMC-00023
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	Space Station Definition and Preliminary Design, WP-01 Operations Planning	SSP-MMC-00015
	Space Station Definition and Preliminary Design, WP-01 SI Impact Study	SSP-MMC-00026
85/12/19	RUR2-4 EMS Data: LeRC WP-04 EMS Theme: Architectural Concepts	RUR2-4EMS-C1.4.2
	Space Station Definition and Preliminary Design Work Package 3 Data Requirement (DR) - 02 Preliminary Analysis and Design Document Sections 1 & 2	GE/TRW DR02 (S1/2)
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	Space Station Definition and Preliminary Design Work Package 3 DR-07 Operations Planning Section A Pre-launch Operations Plan	GE/TRW DR07
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	Space Station Power WP-04 Power System Evolutionary Growth Plan DR-18	RI/RD85-307
	Space Station WP-04 Power System Operations Planning DR-07	RI/RD85-317
	Space Station WP-04 Power System Systems Test and Verification Plan DR-04 Initial Submission- Work Package Level Interface Verification Approach	RI/RD85-316
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85/12/20	IRR-4 EMS Data LeRC WP-04 EMS Theme: Resource Requirements/Customers Accommodations	IRR4EMS-R3.4.1
	IRR-4 EMS Data: LeRC WP-04 EMS Theme: Commonality	IRR4EMS-S4.4.1
	IRR-4 EMS Data: LeRC WP-04 EMS Theme: Logistics	IRR4EMS-S3.4.1
		IRR4EMS-S3.4.3
	RUR2-4 EMS Data LeRC WP-04 EMS Theme: Functional Allocation	RUR2-4 EMS-C6.4.4
	RUR2-4 EMS Data: LeRC WP-04 EMS Theme: Growth	RUR2-4EMS-C2.4.3
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		RUR2-4EMS-S6.4.8
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	Space Station Definition and Preliminary Design Work Package 03 DR-02 Preliminary Analysis and Design Document Book 5 Customer Servicing	RCA-DR02-5
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	Space Station Definition and Preliminary Design Work Package 03 DR-04 Systems Test and Verification Plan	RCA-WP3-STVP
	Space Station Definition and Preliminary Design Work Package 03 DR-06 Customer Accommodations Book 1 Intro & Summary Attached Payload Accommodations	RCA-DR06-1
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	Space Station Definition and Preliminary Design Work Package 03 DR-07 Operations Planning Summary (Preliminary)	RCA-DR07-1
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	Space Station Definition and Preliminary Design Work Package 03 DR-16 Software Development, Test and Verification Plan	RCA-DR16
	Space Station Definition and Preliminary Design Work Package 03 DR-17 Automation and Robotics Plan	RCA-WP3-ARF
	Space Station Definition and Preliminary Design WP-04 Electrical Power System (EPS) DR-4 System Test and Verification Plan	45300.100-DR4
	Space Station Work Package 2 Definition and Design Phase Applicable Document Review	SSS85-0213
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	Space Station Work Package 2 Definition and Preliminary Design Phase NASA SP-7012 International System of Units (SI) Impact Study	SSS85-0187
	Space Station Work Package 2 Definition and Preliminary Design Phase Operations Planning Summary	SSS85-0208
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	Space Station Work Package 2 Definition and Preliminary Design Phase System Test and Verification Plan	SSS85-0206
85/12/31	Intelligent Robotic Systems Study Progress Report Report Period November 4, 1985 through December 31, 1985	MCR-85-654-5
	Progress Report for Period Dec 1 thru Dec 31, 1985 for Space Station Common Module Power System Network Topology and Hardware Development Program	MCR-85-618-7
	Refurbishment of Three Axis Attitude Motion Simulator Monthly Activity Report of Contract NAS8-36409 No. 5 for Period Ending 31 December 1985	SC8-36409 PR5
	Research Study: Space Station Natural Environment Design Criteria Studies Monthly Progress Report Reporting Period: Dec. 1, 1985 - Dec. 31, 1985	USRA8-36400 PR5
	Solar Alpha Joint Design Progress Report for December 1985	SPERRY8-36415 PR4

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85/12/31	Space Station Level C Interface Requirements Document Propulsion System to Orbiter Interface Requirements	SS-IRD-0702
	Space Station Level C Interface Requirements Document Propulsion System to Space Station Interface Requirements	SS-IRD-0700
		SS-IRD-0701
86/01/18	Space Station Logistics Simulation and Data Base Development Logistics Support Analysis Plan	LOG-MMC-00006
86/03/12	NASA KSC Space Station Operations Analysis Module Outfitting Analysis	EMS-R1.K.1
86/06/19	Space Station Definition and Preliminary Design Work Package 3 DR-06 Customer Accommodations	GE/TRW-DR06

82/01/01 This document describes the Space Operations Center (SOC) Program as defined by the first system analysis study. Section I: All SOC elements defined to date are described to the level of detail that they were studied to date. This section is organized by the WBS shown in Fig. 1 on pp.3&4. Each element of SOC is given a WBS dictionary definition and each element is briefly described and illustrated. Mass estimates for elements are given. Section II: Descriptions of SOC are given. This includes build-up operations, construction, flight support and satellite servicing operations. Section III: SOC programmatic and cost analysis are presented.

D180-26495-3

This document is a handbook presenting logically the elements of a systematic approach to control nonmetallic materials hazards. Overall program & design guidelines are presented, & interfaces with other programs & engineering elements are identified. The purposes of this handbook are (a) to give the design engineer an understanding of the elements involved in establishing a materials control program and (b) to provide the design engineer with adequate selection guidelines, test reqs, & test data to assist him in the implementation of such a program on a particular hardware contract. The goals of the handbook are: to assist NASA contractors in the application & selection of non-metallic materials for manned spacecraft; to eliminate duplication of materials testing by providing a central source of materials test data; and, to make available to all gov't agencies the technology developed by NASA in areas of materials flammability & offgassing. Results of materials tests are included.

JSC-02681

This document provides a summary of TRW's SP program studies which began in June 1980. A background of TRW activities is given. SP programmatic activities and cost estimation methodology are outlined. An assessment of the program is given, including the following: why the SP is a mature concept; the thoroughness fo SP preliminary design; SP as economical approach to space science; and, SP is logical first step to routine man-in-space. System design & interfaces are also discussed: 1)system & P/L requirements; 2)SP BL design; 3)SAMSP Accommodation; 4)system interfaces; and, 5)summary of system-level trades. Sys req. were allocated to subsys: EPS,TCS,ACS,DHS,communications, structure & mechanism, reboost module, & flight support equipment. Operations discussion topics were also covered: operations & GSE in factory & at launch bases; mission operations at initial launch, in rendezvous, service & maintenance & crew sys. An SP economic evaluation is also included.

TRWB-33956-PS

This document records the system and program requirements for a Space Operations Center as defined by systems analysis studies. It is intended as a guide for future study. The systems definition will be periodically revised. The first version of this document was JSC-16244, and it was a revision based on 1981 Space Operations Center (SOC) studies. This document puts forth requirements for a low Earth orbit SOC and includes requirements which operate in conjunction with capabilities provided as mission needs develop. General requirements are given for the SOC Program, space facility service modules, logistics modules, docking tunnel, subsystems, flight support facility, construction facility, satellite and mission servicing facility, general support equipment, and storage facility.

D180-26495-2

This document reports on a study of the Space Operations Center (SOC). This executive summary covers the results of a 1979 JSC report (volume 1 of four volumes). SOC program objectives are discussed listing characteristics desirable in SOC. NASA's background interest in SOC is summarized, as is the

D180-26785-1

- 82/01/01 question of "Why man in space?" Mission modeling and utility analysis are discussed: influence of operations on a manned station. Missions included those dealing with science and technology, commercial, and Defense projects. Reference and alternate configurations for SOC are given. Flight attitude, module arrangement, and location of SOC facilities are discussed. Subsystems discussed: environmental control, electrical power, propulsion, flight control, tracking, and data management. Possible uses of ET are listed. Cost and program options are examined concluding that the SOC should be designed to accommodate future additions which initially are not within funding capabilities.
- This document reports on several study tasks which examined the interaction of the Space Operations Center (SOC) and the Space Shuttle. The following are examined in the document: 1) orbital altitude; 2) berthing / docking; 3) SOC assembly; 4) SOC resupply and fuel transfer; 5) flight support facility; 6) Shuttle fleet utilization; 7) SOC assembly operations; and 8) Shuttle propellant scavenging. SOC implications, Orbital Transfer Vehicle implications and Shuttle implications are examined in light of programmatic issues. A summary of findings in the study is given.
- D180-26785-2
- This is a documentation of analyses conducted during Space Operations Center (SOC) Systems Analysis Study Extension Final Project (August 1981 - January 1982). Section 2 summarizes the study objectives and gives a cross-reference matrix showing where the study task outputs are documented in Sections 3-9. The tasks undertaken in the study are listed: 1) satellite servicing, test, and checkout; 2) SOC research and applications integration; 3) crew requirements; 4) SOC External Tank configuration; 5) SOC orbital operations; 6) flight support; 7) SOC operations to geosynchronous orbit; 8) conduct mission needs and modeling analysis; 9) SOC requirements and configuration update; and 10) programmatic.
- D180-26785-4
- 82/01/06 A \$550,000 MSFC contract was awarded to TRW, Inc. in Redondo Beach, California for continuation of alternate system design concept of SP.
- MSFC Release 82-1
- 82/01/12 This document reports on the Space Operations Center (SOC) Phase A Extension Study. A summary of the findings is as follows: 1) mission models for the SOC time period are dominated by commercial and Defense requirements; 2) SOC mission needs are validated (national goals, science / technology, satellite servicing etc., and cost/benefit); 3) mission needs are best satisfied by an evolutionary program; 4) initial configuration uses a single module configuration (outfitted as a habitable service module and resupply module); and 5) the modular approach offers the system versatility. Mission models, requirements, advantages, and graphs supporting the study findings are provided.
- D180-26785-3
- 82/01/13 This document is comprised mostly of charts, lists, graphs, and drawings. In studying the interaction of the SOC & STS, several study tasks were examined: 1) orbital altitude; 2) berthing/docking; 3) SOC assembly; 4) SOC resupply & fuel transfer; 5) flight support facility; 6) STS fleet utilization & programmatic; 7) SOC assembly operations; 8) STS propellant scavenging. SOC implications, OTV implications, and STS operations implications are examined in light of programmatic issues. A summary of findings in the study is given: 1) ET propellant scavenging is feasible & practical; 2) benefits are enormous; 3) propellant storage is required; 4) space based OTV maximizes benefits; 5) major functional implications on SOC are defined; and, 6) technology appear nominal.
- RI-PD82-1A

82/02/01 This document contains a handwritten summary of a meeting held on 2/11/82 concerning GS, payload accommodations/flight operations, communications/data, and packetization of the SP. A list of meeting attendees and the companies they represented is given. This document also contains a group of charts which were available at the meeting: 1)GS BL free-flyer operations; 2)GS functional elements & interfaces; 3)data handling facility functional requirements; 4) simplified data flow; 5)SPCC requirements; 6)SPCC off-line requirements; 7) SPCC real-time requirements; 8)PCC requirements; 9)PCC off-line requirements; 10) PCC real-time requirements; 11)GS cost drivers; 12)design reference mission no. 1; 13)PCC projected data; 14)DRM Sensor summary; 15)on-board v. ground trade studies; 16)preliminary command traffic sizing; and, 18)SP uplink command format (preliminary).

MDAC-33955-SP655

This document contains the data re a study conducted in 1982 designed to reach the following objectives: define & evaluate the concepts for evolving a space station in conjunction with the Space Platform for NASA Science, Applications and Technology and a permanently manned presence in space early, with a maximum of existing technology. The study tasks are as follows: special studies of unmanned platform in areas highlighted in prior study (innovative basic concepts, control system dynamics, & P/L accommodations assessment); conceptual definition of manned SP (requirements & candidate concepts, systems analysis & definition, and comparisons, programmatics, & selection). Study task flow, study schedule, and study conclusions are also given. An agenda is also provided listing those subjects to be discussed: manned SP objectives approach & conclusions; system-P/L-mission requirements; configuration & operations; subsystems, habitability, & safety; and, programmatics.

MDC-69766

This document is a report which presents a description of the SA configuration and design performed under NASA-MSFC contract NAS8-32928 Exhibit I for the MDAC Power System Spacecraft. This report is an update of LMSC/D764733A. The major sections of this report describe structural-mechanical and electrical module designs and provide preliminary performance predictions. This report is not intended to provide a flowdown of requirements, design methodology, trade studies, or costs. Structural-mechanical design description, including blanket module, support structure assembly, extension mast assembly, and positioner assembly, is given. Electrical module design description, including solar cell assembly and circuit elements, is also given. Electrical, weight, structural, and thermal performance is also considered. Table 1.0-1 lists Mission and Major Array Requirements.

LMSC-0836880

This report contains the results of the study that analyzed in greater detail the implications to SOC as a consequence of the STS supporting operations. The study also addressed programmatic influences associated with propellant deliveries, spacecraft servicing, & total STS flight operations. The report is organized into 4 basic sections according to the 4 major tasks which have been studied (objectives are given): 1)STS fleet utilization and programmatics (obj: determine requirements & related programmatics data for SOC/STS operations in LEO); 2)SOC assembly operations (obj: confirm capability of RMS to assemble SOC); 3)STS propellant scavenging (determine functional impacts on SOC); and, 4)flight support facility (obj: to compare the servicing/checkout logic & costs associated with performing flight support services on free-flying satellites & OTVs at the SOC, on ground, and from the Orbiter).

SSD-81-0194

Volume II contains appendices which contain reference data in support

SSD-81-0194

DATE	ABSTRACT	ID NO.
82/02/01	of Volume I (SSD 81-0194). The four appendices include information on the following: Appendix A: Servicing Functions Definitions; Appendix B: Servicing Activity Data Sheets; Appendix C: Detail Time and Manpower Estimates; and, Appendix D: Cost Analysis Sheets.	
82/02/05	This document is a one page memo from Simmons of TRW to W.R. Lea/PM01 of MSFC. The following is the text of the memo: "Forwarded herewith are 50 copies of the Interim Review Briefing material Volumes I and II dated 9 February 1982 in accordance with the subject contract Data Requirements (DRs)."	25kW-PS-1129
82/02/09	This document is Volume 1 of a two-volume set provided as briefing material for a meeting concerning Space Platform held by TRW in February 1982. Volume 1 covers the following subjects: 1) Space Platform status, characteristics, development, planning schedules for FY84, and milestone schedules; 2) payload accommodations; 3) system design and interfaces; 4) spacecraft configuration; and 5) operations.	34444.002-007
	This document is volume 2 of a 2 volume set provided as briefing material for a February 1982 meeting concerning Space Platform by TRW. Volume 2 covers the following subjects: 1)Electrical Power Subsystem; 2)Thermal Control System; 3)Attitude Control System; 4)Data Handling Subsystem; and 5)reliability and redundancy management.	34444.002-007
82/02/10	This document appears to be a handout provided by TRW at a splinter meeting which was held at MSFC on 2/10/82. The document contains no formal, written text but utilizes lists, charts, and diagrams to relay information. The document includes a list of requirement developments in progress: review operations req. of other programs; analyze operations req. dictated by SP sys & subsys designs; support mission analysis to develop ground req for P/L's; allocate req. to DHS, SPCC, & PCC; and, develop scenarios & operations guidelines. The subjects covered in particular in the document are as follows: 1)alternative high rate mux; 2)high rate data flow; 3)low rate packetization sys; 4)port-to-port communications; 5)DDD P/L security; and, 6)reliable space/ground communication.	TRW8-33956-FOA-SM
82/02/11	This document corresponds to document #MSFC-MDAC-SP-FAY 82; in particular, this document contains the agenda and informational material for 2/11-12/82 splinter meetings at MSFC. The following is a list of topics covered at the meetings and consequently dealt with in the report: programatics; communications/data management/software; electrical power; thermal control; attitude control; structure/mechanism; crews system/maintenance; payload accommodations/flight operations; and, government wrap-up. The document contains no formal text, but it utilizes lists, charts, and graphs to relay appropriate information.	MDAC8-33955-FY82
	This document is the agenda of a meeting entitled above at MSFC 4200 on February 11 and 12, 1982. PL accommodations analysis and SAMSP requirements, flight ops analysis, BL design/operations, related IRAD projects, candidate technology, and programatics were the topics of discussion. Splinter meetings were also held discussing communication/data management/software, EPS, TCS, ACS, crew systems, and payload accommodations. No additional information is given concerning the meeting except for the schedule of events.	MSFC-MDAC-SP-FY82
82/02/12	This document provides the agenda for the first quarter review of the	MDC-69761

DATE	ABSTRACT	ID NO.
82/02/12	Space Platform FY 82 Study by MDAC and lists the names of individuals responsible for covering specific topics listed on the agenda. The agenda includes the following: 1)payload accommodations analysis & SAMSP requirements; 2)flight operations & ground system analysis; 3)BL design/operations(design, platform,& solar array operations & maintenance, & momentum management & pointing); 4) related IRAD projects; 5)candidate technology; and, 6)programmatics(cost/schedule options).	
82/02/18	This document a is memo from W.H. Hooper to L.E. Powell thru C.S. Cornelius. Hooper relayed the following information concerning a meeting held on 2/12/82: Ron Arnold of MDAC presented an agenda; MDAC was asked to study the accuracy requirements for onboard ephemeris data; a concern was expressed in regard to the SP's central recorder being able to satisfy the payload requirements; and, MDAC requested a mission model of the TDRSS load requirements.	MSFC-EL14-14-82
82/02/19	This document is listed as the progress report for the performance period from 26 December 1981 through 5 February 1982. The report lists the following accomplishments for the report period: new payload analyses; flight operations analyses, including completion of packetization of trade studies for low- and high-rate data return channels, definition of ancillary data concept, and studying of payload and Space Platform operational requirements; continue subsystem definition studies, including Attitude Control, Ground Support, Platform/Shuttle communications links, Electrical Power, and Thermal Control; assessment made of SAMSP accommodation; and programmatics were discussed.	34444.013-019
82/02/22	This document is 2 pages of handwritten notes taken at the TRW Ground Segment Review- Interim meeting on 2/22/82. The note-taker has written at the top of the first page that meeting attendees were "discussing only ground segment." The following is a list of topics which apparently were discussed in the meeting: design reference mission; payloads; PCC; SPCC; anomaly analysis; and, mission planning.	TRW8-33956-GSR1
82/02/23	This document is a memo addressed to C. Cornelius from N.L. Ginn and is concerning a subject meeting held at MSFC on 2/12/82 at which MDAC presented an overview of their FY 82 Study Plan expounding upon some of the areas being studied, approaches taken, and options being defined concerning the SP Communications/Data Management/Software.	MSFC-EF22-SSS
	This document is a memo from Ginn to C. Cornelius outlining TRW's presentation at a 2/23/82 meeting: 1) TRW's studies primarily concerned the high rate data system in the area of time division multiplexing and packetization; 2) the studies included a new design High Rate Multiplexer; 3) full utilization of the 300 MBPS TDRS capability by changing to a 1:1 I/Q power split; 4) plan to packetize low-rate data flow; and, 5) propose hardware port-to-port communications link.	MSFC-SP-6SSS-2/82
82/02/26	This document is a transmission from Crawford of MDAC in California to Mr. Gene Beam of MSFC. The transmission is concerned with the SP ground system. The document contains a brief explanation as to what the SP GS is and then proceeds to list questions which might be useful in identifying user req. that will affect the SP GS. Several examples of questions contained therein are: "How are the commands to your payload generated?"; What is a typical response time for processing of payload data and generation of a new command load?"; and, "Can	MDAC8-33955-695PU

DATE	ABSTRACT	ID NO.
82/02/26	you provide a top-level scenario of a typical science observation session when operating on-line at the PCC?."	
82/03/01	This document was prepared by TBE for the SP Project Office at MSFC under Contract NASB-34586. This document contains a description of, and the requirements for, a set of P/Ls included in the SP study activities managed by the MSFC SP Project Office. Two categories of descriptive data are presented: 1) pertaining to individual science instruments or facilities and 2) pertaining to entire P/Ls. Other areas dealt with are: P/L definition; P/L description; description of science instruments or facilities contained in P/L; instrument internal specifications; external requirements; P/L concepts (e.g., signal, electrical power, and active thermal control integration hardware); and, integrally mounted P/Ls.	SP82-MSFC-2583
82/03/02	This document is a manual which releases technical policy statements approved as JSC Design and Procedural Standards. A Keyword Index is provided in which words selected from the scope of each standard are presented alphabetically.	J8400045
82/03/08	This document is a letter from Novick of TRW to L.E. Powell of MSFC in which information re how to implement a low-cost manned space station program is given, per the request of Mike Weeks of DSTS. The attachment to the letter is TRW's response to Weeks' request. Powell was asked to relay the response to Weeks. The guidelines stipulated by Weeks for implementation were: SP program to be executed for \$600 M and the necessary elements for manned occupancy of the SP to be obtained for an additional \$500 M. Two Spacelab long modules would be available at no cost to the program, and that these modules are to be converted into habitability modules for a low-cost manned SS. Three tables help explain the information: Table 1 gives SP real-year dollar costs; Table 2 gives costs of elements which must be added to SP to produce a manned SS; and, Table 3 presents a summary of the total cost data from Tables 1 & 2 in both fixed FY 81 dollars and in real year dollars.	SP-1192
82/03/15	This document is a progress report of the Study Plan under contract NASB-33955 with MDAC and summarizes work accomplished during the period from December 1981 through February 1982. In the report, study activities are categorized into 2 major task groupings: Task 1 includes 9 subtasks (including P/L accommodations analysis, FO analysis, new component/mechanism development & testing, and BL design/operations definition); Task 2 which includes 9 subtasks (including SASP[manned] and reassessment of SP configuration); and, Task 3 includes reviews and reports. The document specifically deals with work accomplished in each subtask, Future or Continuing Activities, the Schedule Status of each subtask, and Problems & Areas of Concern are covered.	MDACB-33955-SA-5
82/03/19	This document is listed as the progress report for the report period from 6 February through 5 March 1982. Significant accomplishments for the period include: the Interim Review was held at MSFC on 9 February; update of mass properties and cost data were submitted; effort was initiated to define and cost the various Ground Segment elements; a briefing was given to the Space Platform End-to-End Data System Working Group; reevaluation of the Space Platform baseline design is underway; a high-current motor-driven switch was received from the vendor; a decision was made to adopt the Sperry FMDM for the Data Handling System; and a purchase order was issued to Hamilton Standard for thermal testing of a sub-scale cold plate. Funding was a major concern during	34444.013-020

DATE	ABSTRACT	ID NO.
82/03/19	the report period.	
82/03/24	This document provides the agenda for a Ground System Study Review held on 3/24/82. The agenda includes coverage of the following subjects: an overview of the GS-objectives, schedule, & DRM update; requirements update-documentation & systems drivers; system definition-system concept update, end-to-end data flow, & initial concept for each facility; trade study status; and, cost groundrules. This document contains no text but utilizes lists and charts to relay information.	MDACB-33955-GSS-IR
82/03/25	This document is an overview of GS requirements for the SP. The document is divided into 5 sections: introduction, concept development, requirements, costing guidelines, and plans. The entire document contains no "narrative" type discussion but utilizes lists and charts to enumerate pieces of information concerning SP GS requirements. Concept development is covered for the following areas: enhanced ground monitoring/control; support of sequential P/L's; PCC services; and, uplink generation elements. System requirements covered in the document are involved with the following areas: external interface; components; sequential support; scope; and, reliability. SPCC system level requirements, PCC system level requirements, and DHF system level requirements are included within the latter.	MDAC-FACC-3/82
82/03/26	This document is a short memo distributed concerning the February 1982 progress report on the TRW Phase B Study and the December 1981, January and February 1982 MDAC Phase B Study. Those receiving the memo are listed on the document.	MSFC-PM01(82-37)
82/04/05	This document is a letter from Novick of TRW to W.R. Lea of MSFC which has enclosures which contain the following: WBS & task descriptions which were to be used for the costing of the SPGS and a preliminary master milestone schedule. The task descriptions consider the following topics: project management; systems engineering; ground system hardware, including DHF, SPCC, & PCC hardware; ground system software, including DHF, SPCC, & PCC; ground segment integration & test; and, operations support, including DHF, SPCC, PCC, & training.	SP-1276
82/04/06	This document is a memo notifying those concerned that TRW would be at MSFC on 4/22/82 for a preliminary review of their study effort on the SP end-to-end mission operations system. A list of meeting attendees is provided in the document.	MSFC-PM01(82-41)
82/04/09	This document is the suggested agenda for a meeting designed to be a review of SP ground segment studies. The document is set up as an outline. The following is a summary of the outline's contents: I. Requirements and Operations Concept: I.1. Introduction; I.2. Requirements: a. mission operations planning & command management, b. telemetry data processing & display, c. analytic support, d. staffing, e. data handling & distribution, f. orbit geometry computations, g. software maintenance, h. DHF, SPCC, PCC requirements summary, i. requirements trade summary. II. Conceptual Design: a. DHF hardware configuration; b. SPCC hardware configuration; c. PCC hardware configuration; d. software architecture; and, e. trades summary. III. End-to-End System: End-to-End Data System Issues and Payload Operations Accommodations.	TRWB-33956-GSR
82/04/12	This document supersedes SE-R-0006B of 3/29/76. The purpose of this	SE-R-0006C

DATE	ABSTRACT	ID NO.
82/04/12	document is to define the minimum requirements for materials and processes and to provide a general control and specification for incorporation in NASA space flight hardware procurements and technical programs. This document is primarily directed toward materials and processes used in the fabrication and testing of flight components for manned space flight vehicles. The document also covers GSE where operations or compatibility interfaces can adversely affect the performance of the flight hardware.	
82/04/15	This document is in the series of MDACB-33955-SA-5 ID no. In specific it discusses project activities for month of March 1982. The major focus of the project in 3/82 was in SP GS analyses and the ability of SP to support manned P/L's. GS activities also included support for SP End-to-End Studies. GS requirements & driving issues were identified and initial findings were presented to MSFC. Assessment was made for manned P/L's and included the following activities: 1)evaluation of Manned Support Equipments document; 2)manned safety criteria assessments; 3)operations/configuration analyses; 4)RM reach analyses; 5)SP/Manual-module preparation review of SAMSP & SOC documentation. Also discussed is SA interface coordination, avionics definition, deployable mast options, and electric power subsystem.	MDACB-33955-SA-5-2
82/04/16	This document is a progress report for the report period from 6 March through 2 April 1982 of the Space Platform Alternative System Design Concept Study. The significant accomplishments described in this report are as follows: an initial assessment of Space Platform requirements for manned operation was completed; a preliminary set of Ground Support requirements was formulated and reviewed with MSFC; Ground Support design effort was initiated; a briefing on Space Platform technology availability and requirements was presented; discussions were held regarding future US and European plans for a space station; a draft of the Space Platform/KSC Launch Facility interface control document was provided to MSFC for review; and a revised equipment list for the baseline Space Platform was issued to reflect recent design improvements. A significant concern during the report period was funding.	34444.013-021
82/04/22	This document was utilized as handout informational material for a TRW GS meeting held 4/22/82. An agenda of the meeting is included in the document. The topics discussed at the meeting are also given: I. Requirements & Operations: GS overview, mission operations planning, data handling & distribution, telemetry processing & display, and, SPCC staffing; and, II. Conceptual Design: design features; software hierarchy; data processing flows; mission planning software detailed description; detail software hierarchy charts; DHF hardware design; SPCC hardware design; and, PCC hardware design.	TRWB-33956-GSFR
82/04/23	This document is handwritten and appears to be notes taken in advance of and during a meeting with TRW. (attendees: Al Medler, M. Novick, Bill Lea, Joe Lusk, and Kenny Mitchell). The MSFC officials stressed the following in these notes: 1) cost minimization; 2) do not plan to write a CEI; 3) make clear that the Design reference mission is followed in the ground system concept. Mention is made of the Payload Control Center concept, the Space Platform Control Center, and of the rationale behind the Data Handling Facility. Several references are made to an apparently upcoming June review.	MSFC-KA01-4/82-A
82/04/29	A hand-written note which concerns cost effectiveness through combination of facilities if possible- based on Luther Powell's comment to minimize. Discusses the PCC and some of the possible requirements of it.	MSFC-KA01-4/82-B

DATE	ABSTRACT	ID NO.
82/05/01	<p>This document addresses the concept of an unmanned SASP only. Section 1.1 describes the results of the innovative basic SASP concept study which reviewed the basic configuration options for satisfying the multiplicity of payload and system requirements, including gimballing, tethering, more congregation, more dispersal, and manned-access sections. Section 1.2 describes the results of the analysis conducted to investigate the critical relationships between high-accuracy payloads and the SP dynamics and the intermediary role of instrument pointing systems. Section 1.3 presents the results of a continued analysis of the structural dynamics of the SASP concept. The analysis included modeling the prospects of a three-arm configuration, as a sequel to the two-arm analysis performed in the prior study. The potential benefits of selectively-placed dampers were analyzed.</p>	MDC-H0072
	<p>This document is a report from the MSP Study (Part B) which was to define, evaluate, and select concepts for establishment of an MSP. Section 1 is an introduction. Section 2 describes the results of the systems requirements analysis, including the details of candidate payloads for an early MSP. Section 3 describes a number of basic concepts for a MSP and an evaluation of their features, benefits, and constraints. Section 4 describes the detailed systems analysis and definition performed on two basic concepts recommended in Section 3. Section 5 describes the evaluation approach in recommendation for a reference concept, including a description of the overall configuration, subsystems description, and mass summary. Section 7 describes the technology requirements for the MSP.</p>	MDC-H0072
	<p>This document presents the programmatic data for the reference concept of the MSP. 5 Sections provide details regarding the proposed WBS and dictionary, the facilities and equipment required to produce the modules, the project schedule and logic diagram, a preliminary assessment of environmental impacts, and details regarding the estimated costs for the reference concept. Section 2 contains the proposed WBS with a dictionary outlining the function and activities contained within each WBS element.</p>	MDC-H0072
	<p>This document records the findings of a concept study concerning an evolutionary SP. Section 1 is an introduction. Section 2 describes the results of the MSP Study: systems requirements analysis and details of candidate payloads for early MSP; concepts for a MSP and evaluation of features, benefits, and constraints; reference concept including description of overall configuration, subsystems features, habitability, safety, mass properties, and role of KSC; cost estimates; technology advancement requirements, comparison of various approaches to technology utilization on a program level; and, ideas on early minimum and late growth configurations based on the concept recommended. Section 3 presents the results of selected unmanned platform studies, Task A, which is an extension of a prior study subject. This study focused on innovation concepts, image motion compensation interfaces, and dynamics.</p>	MDC-H0072
	<p>This document traces the activities between MSFC and the Office of Space Science and Applications and the Office of the STS which have cooperated in developing the SP payload requirements. Who was involved and the results of the activities were are also noted. The Phase A Platform Study, Phase B Platform Study, Phase B Follow-on Study, and a summary of project are discussed.</p>	PM007
82/05/14	<p>This document contains a memo distributed by L.E. Powell concerning the SP Mid-Term Review scheduled for 15-18 June 1982. MDAC and TRW are to</p>	MSFC-PM01(82-53)

DATE	ABSTRACT	ID NO.
82/05/14	present the status of their follow-on tasks. A list of names to whom the memo was circulated is given. There are also 2 letters included in this document which are from contractors. One is from L.P. Morata of MDAC providing Powell with a proposed agenda for the MDAC meeting and the proposed splinter meetings. The second letter is from M.W. Novick of TRW providing Cecil Gregg and Powell with TRW's proposed agenda.	
	This document is a monthly report for the period from 3 April through 7 May 1982 on the 25kW Alternative System Design Concept Study. The significant accomplishments of the study for the report period were as follows: an assessment of Space Platform compatibility with various manned space station requirements was completed and provided to MSFC and NASA/HQ--no significant incompatibilities were identified; refinements in Space Platform subsystem design were adopted to improve reliability and reduce costs; a briefing was presented to MSFC covering Ground Support requirements and design; revised requirements documents were issued to candidate subcontractors for bidding purposes; costing of Space Platform Flight and Ground Segments was initiated; detailed drawings were provided to the Vought Corporation for fabrication of a simplified full-scale Orbital Replacement Unit cold plate; and preparation for the mid-term review was made. Lack of funding remained a concern.	34444.013-022
82/05/15	This is another document in the MDACB-33955-SA-5 series and is primarily concerned with discussing project activities for 4/82. The major focus of the project as discussed in the document is on SP GS analyses & SP ability to support manned P/L. Also discussed were GS activities including preparation of detailed requirements re the SPCC, PCC, & DHF. Definition of system configuration concepts was also initiated. Configuration and safety issues re manned capabilities was presented to MSFC. Comparisons were made between SP design & SAMSP and SOC & SS requirements. SP was found to be compatible with manned mission.	MDACB-33955-SA-5-3
82/05/21	MSFC plans to award several study contracts for aerospace firms to explore the early uses of the space station. The contracted firms are invited to describe how an early space station could be used as a test facility in advance of operations in the late 1990s. One study would look at the role of the station in building large structures in orbit; a second study would examine the servicing and maintaining of satellites; and, a third study would examine the relationship of the station with an OTV. According to William G. Huber, manager of the Space Station Task Force at MSFC, these studies would assume a station will be in orbit by 1990. Responses to the request for proposal are due by 6/21/82, and the contracts are expected to be awarded by 8/82 and will run for eight months.	MSFC Release 82-54
82/06/01	A report listing environmental design criteria guidelines based on statistics for atmospheric & climatic phenomena relative to various aerospace industrial, operational, & vehicle launch locations. Phenomena covered: winds, inflight thermodynamic properties, precipitation, fog, humidity, atm. density & pressure, tornadoes, atm. electricity, clouds, thermal radiation, atm. chemistry, and geologic hazards. Analysis of atmospheric data are presented & analyzed for application to aerospace vehicle design studies. Atmospheric parameters are scaled to show the probability of reaching or exceeding certain limits to assist in establishing design & operating criteria. Criteria data were formulated based on discussions with & requests from engineers involved in space vehicle development & operations. Geographical areas covered: KSC, VAFB,	J8400086

82/06/01 Edwards AFB, JSC, White Sands Missile Range, Michoud Assembly Facility, National Space Tech Lab.

TM-82473

This document contains no formal written text but instead utilizes lists, charts, and graphs to relay information. The SP study status is discussed: current contract performance period ends 7/31/82; refinement of the BL design has continued; SP capability has been compared w/req for various manned SS req; safety/reliability reassessment was completed; GS req were established and sys design was formulated; and, cost & schedules were developed for GS and for refined SP design. Recent BL SP improvements are listed and BL characteristics. An assessment of manned compatibility is also given. SP GS req are given: support operation of SP & P/Ls by providing these capabilities- mission & command planning, command generation, return data handling, telemetry data processing & display; interface w/TDRSS, NASCOM, & other NASA ground facilities; support operation of SP & its P/Ls during the free-flyer mode; and, support P/L testing.

TRWB-33956-ES/62

This document contains the agenda for a June 1982 briefing concerning SP programatics. Areas covered in the document are as follow: updated baseline cost estimate; hardware costed for P/L accommodation-berthing mechanism; growth from 11.5kW to 25kW-baseline pre-launch & on-orbit; replication cost for second space platform; and, manned compatibility. This document contains no formal text but relies on lists, charts, and graphs to relay information.

MDAC-33955-PSB

This document contains the specification which establishes the requirements for performance, design, & verification of one type-model of equipment identified as a SP CEI #DR-8, Part 1. The CEI is to provide on-orbit services to both free-flying payloads delivered by STS and to payloads remaining in the Orbiter payload bay. The services to be provided will include electrical power, stabilization & altitude control, pointing, communications, data management, and thermal control. CEI specifications for FSE & GSE are published as FSE CEI #DR-8, Part 3 and GSE CEI #DR-8, Part 2 respectively. Requirements, verification, and preparation for delivery are discussed among the CEI specifications.

MDC-69317

This document defines the interface between the Space Platform and the manned elements of the Space Station via the airlock/adaptor. This interface control document specifies the capabilities of the 12.5kW baseline version of the Space Platform. This document is effective for the manned Space Station airlock/adaptor mated with and supported by the Space Platform. The document specifies and controls the interfaces which the Space Platform provides to the airlock/adaptor and indirectly to the other manned elements. The document covers the following regarding interface requirements: 1) physical interfaces; 2) functional interfaces (Electrical Power System, Data Handling System, Attitude Control System, software); 3) induced environment (payload shock and acceleration, pressure, radiation, contamination, charging requirements; and 4) mission and performance interface (orbital constraints, communication coverage, berthing, safety. Interface verification is also discussed.

34444.009-006

This document is a briefing supplied by TRW in order to perform the following functions: review SP studies performed for NASA; outline the available results developed by TRW on SP design, operations, NASA applications, and

TRWB-33956-SPS

82/06/01 possible extensions to DOD missions; and, suggest possible follow-on studies for new applications. A background of the SP is given with an overview of SP studies. SP nomenclature is explained. Subsys design and approach are examined. SP/DOD P/L security is included. A summary of study findings is as follows: SP is cost effective- it accommodates multiple, independent P/Ls on long-lived missions and short-lived missions with exploratory emphasis; and, SP is technically realizable now- existing technology and many existing subsys and long term growth potential with evolution of technology.

This document is a final report relaying the results of a contract granted in order to perform basically two tasks: 1) Develop and negotiate a simplified large-area solar cell specification, purchase large-area wraparound contact silicon cells representing low-cost alternatives, and investigate the potential of even larger cells (10x10cm) for further cost reduction; and, 2) conduct cell level electrical, mechanical, and rapid thermal cycle tests, fabricate 4-cell and 30-cell modules, and conduct module electrical and thermal cycle tests. All efforts including analysis, conceptual descriptions, manufacturing details, test results, cost data, assessments of modules fabricated, and recommended technology for a follow-on contract are included in this final report. Appendix A list the Notes on Copper Contacts and Appendix B provides the Post Thermal Cycle Inspection Sheets.

LMSC-D843500

This document is a final review report provided for a meeting of LMSC officials working on the SA project. Basically two tasks were pursued in the study and consequently examined in the report: Task 1- simplified cell specification review, cell procurement, & larger cell discussion and Task 2- module fabrication, cell & module test results, and 30-cell superstrate results. The objectives of each task are as follows: Task 1- LMSC/cell vendor to negotiate simplified large-area solar cell specification, purchase large-area 5.9x5.9cm wraparound solar cells from cell vendors representing low cost alternatives, & investigate larger-area cells(10x10cm) to determine feasibility of further cost reduction; and Task 2- conduct electrical, mechanical, & rapid thermal tests and fabricate 30-cell superstrate module. Conclusions reached concerned alternate contact configuration/metallization and superstrate versus conventional.

LMSC-100kW-FR

This document is a manual prepared in conjunction with a 6/82 Midterm Review re MDAC work on the SP. On the agenda were the following topics of discussion: 1)ground study overview; 2)design changes; 3)on-orbit maintenance; 4)manned-payload interfaces; 5)data packetization and error coding; 6)SP passive thermal assessment; 7)cold-plate testing; 8)ACS hardware implementation; and, 9) loads analyses. The following is a summary of the conclusions reached as a result of the study: 1)BL changes have enhanced SP design, production, and operations; 2) design verified to be manned compatible; 3)SP GS definition shows ease of P/L accommodations; 4) programmatics updated the latest project planning; and, 5) SP remains ready for new start. There is no written text to this document: charts and lists are used to relay information, along with diagrams.

MDAC-33955-ES

This document is an addendum to a 6/81 version of "Program Analysis and Planning for Phase C/D DR-3" and reflects findings of SP studies subsequent to the original publication. No significant changes in programmatic logic or flow were caused by the studies &/or subsequent design/software changes. The addendum sections parallel those of the original document and necessary changes are identified. This document points out that the name "Power System" has been

MDC-69314

82/06/01 changed to "Space Platform." The following is a list of changes from the original as summarized in the document: 1) program milestone schedules; 2) design changes; 3) subsystem design/development; 4) manufacturing, test, and mission support; and, 5) technology assessment.

This document is submitted as a preliminary up-date submission of Data Item #DR-6 of Contract NAS8-33955 Suppl. Agr. #5. Contained herein are summary cost impacts as a result of program revisions to 6/81 DR-6 BL. This submittal contains the following data: 1) cost summary of revisions by WBS to 2nd level; 2) subsystem change definition summary from 6/81 BL including revised hardware descriptions; 3) cost breakdown sheets in constant 1980 dollars by contractor budget function to 2nd level WBS; 4) Expenditure forecast based on updated estimate & revised schedule by gov't FY by 2nd level WBS; 5) funding profile at total level by gov't FY; 6) program schedule revised to reflect changes in authority to proceed, interim milestones, & end data; and, 7) hardware quantity & usage list revised requirements. The approach to derivation of revised cost starts w/the 6/81 DR-6 as BL & is estimated as delta impacts thereto. The estimating process & technique are identical to that used in BL data.

MDC-69315

This document is the product of a study with the following objectives: 1) negotiation of simplified large-area solar cell specification; 2) acquire large-area wraparound solar cells; 3) determine feasibility of cost reductions in large-area cells; 4) conduct electrical, mechanical, and rapid thermal cycle tests; 5) fabricate 4-cell modules; 6) conduct module electrical/optical & rapid thermal cycle test; 7) fabricate 30-cell superstrate module. Gives specification for low-cost SA. Conclusions of the study were concerning: 1) alternate contact configuration/metallization & 2) superstrate versus conventional.

LMSC-SAR-100KW

This document provides the agenda for the midterm review of FY 82 SP Study. The names of individuals responsible for covering certain topics are given. The topics are as follows: 1) ground study overview; 2) design changes; 3) on-orbit maintenance; 4) manned payload interfaces; 5) data packetization/error coding; 6) SP passive thermal assessment; 7) cold-plate testing; 8) ACS hardware implementation; and, 9) loads analysis. A summary of the report's findings is also given: 1) BL changes have enhanced platform design, production, & operations; 2) design verified to be manned compatible; 3) SP ground system definition shows ease of payload accommodations; 4) programmatic updates to latest project planning; and, 5) SP remains ready for new start.

MDC-69798

This document was designed to define and control the interface issues between the LMSC Solar Array and MDAC SP. The document defines the interface requirements (design, environmental, operational, and safety) in Section 3, and verification responsibilities in Section 4. The actual SA/SP interface design is provided in Appendix A and Appendix B contains the SA/payload interface design information. This document is part 3 of four parts.

MDC-69318

This ICD defines and controls the design of interfaces between the PS, PS FSE, and Shuttle Orbiter. The specific types of PS-FSE-Orbiter interfaces covered in this document are as follows: 1) physical; 2) structural; 3) environmental control; 4) electrical power; 5) avionics; 6) stabilization and control; and, 7) power system/orbiter software. The subject of induced environments (e.g., vibration, acoustics, shock, temperature) is covered. This document is part 1 of four parts.

MDC-69318

DATE	ABSTRACT	ID NO.
82/06/01	This ICD establishes performance requirements and defines and controls technical aspects of the Radio Frequency Communications and Tracking System interfaces between the SP and the NASA Spaceflight Tracking & Data Network including the Tracking & Data Relay Satellite System. The C&T interfaces defined in this document are also applicable to the TDRS and GSTDN Compatibility Test Van. The C&T interfaces defined and controlled by this ICD are the RF transmission links between the SP and STDN. This ICD does not apply to the SP RF links to the Orbiter. Specific interfaces are identified in Section 3 of this ICD. This document is part 4 of four parts.	MDC-69318
82/06/14	This document is a letter from M.W. Novick of TRW to L.E. Powell of MSFC in which Novick informs Powell of TRW's sending copies of documents to MSFC which reflected the company's efforts to define requirements and a concept for the SP6S. The enclosed documents were 1) #34444.000.001 Ground Segment Design Report and 2) #34444.000.002 Space Platform Ground Segment Requirements. See these two documents as numbered.	SP-1325
82/06/15	This document is in the MDACB-33955-SA-5 series and this particular document chronicles the project activities for the month of May 1982. The major focus of project in 5/82 was SP 6S analysis and updates which were made to the SP BL. 6S analyses included preparation of hardware & software configuration definition for SPCC, PCC, & DHF. BL updates were made to incorporate configuration and optimization trade selections. Interface coordination of SA also continued. An update of SP/SAMSP/SOC comparison matrix is also given.	MDACB-33955-SA-5-4
82/06/16	The points covered in this document concerning the Space Platform Controls and Display System: 1) system reevaluation and changes; 2) system hardware description (FMDM function, growth capacity, and new design requirements); 3) system firmware description (firmware function, memory sizing, and processor and I/O capacity; and 4) packetization impact (firmware and hardware).	41-1555-00-07
82/06/17	This document contains a section listing the Space Platform Ground Segment (SP6S) Requirements, and the section is organized into three major sections dealing with definition, functional flow diagrams, and a requirements summary. The operations concept of the SP6S is given. Data handling and telemetry data processing as part of mission operations and on-board low-rate data handling are considered, and high-rate and low- and high-rate ground data handling are considered. Data Handling Facility (DHF) requirements and ground checkout payloads are discussed. DHF design, Space Platform Control Center (SPCC) design, Payload Control Center (PCC) design are considered. Development approach and growth options are covered. Staffing and training for users of the DHF, SPCC, and PCC are considered.	34444-000-001
	This document contains preliminary functional requirements for the Space Platform Ground System (SP6S) which is Space Platform-dedicated ground based equipment and facilities used to support Space Platform and payload operations. The purpose of this document is to provide a basis for initial design studies of the SP6S. A definition of functional requirements for the free-flyer mode of operations, and an allocation of the functions to the Space Platform Control Center (SPCC), Payload Control Centers (PCC), Data Handling Facility (DHF) are provided. This document is not a complete or formal SP6S specification. Definitions of elements and characteristics of the SP6S are given, including SPCC, PCC, and DHF functional requirements.	34444-000-002

DATE	ABSTRACT	ID NO.
82/06/17	<p>This document is a briefing report designed to complement a mid-term review of studies in June 1982. The document contains no formal, written text but utilizes lists, charts, and graphs to relay information. The following is a list of Space Platform topics discussed in the document: 1) system design and interfaces; 2) Space Platform spacecraft accommodations; 3) payload accommodations; 4) reliability, safety, and redundancy management; 5) operations; 6) Attitude Control System; 7) Electrical Power System; 8) Thermal Control System; 9) Data Handling System; 10) Communications; 11) Ground Support requirements; 12) Ground Support design; and 13) Ground Support operations.</p> <p>This document is the agenda for the above mentioned meeting which was held at MSFC 4200 on 6/17/82. The topics concerning the SP which were covered in the meeting were: 1) system design and interfaces; 2) SP spacecraft configuration; 3) payload accommodations; 4) reliability/safety/redundancy/management; 5) operations; 6) SP subsystems; and, 7) ground segment definition. The subjects for discussion in the splinter meetings on 6/18/82 are also given. No further information is given concerning specifics of the meeting: only a schedule of events is provided.</p>	34444.002-008
	<p>This document is volume 2 of documents provided for a Space Platform meeting held in June 1982 by TRW. The topics covered at the meeting and in this document are as follows: 1) Attitude Control System; 2) Electrical Power System; 3) Thermal Control System; 4) Data Handling System; 5) Ground Segment requirements; 6) Ground Segment design; and 7) Ground Segment operations.</p>	34444.002-008
82/06/18	<p>This document appears to be a handout used at a splinter meeting called to discuss Space Platform programmatic. Contained in this document is TRW's rough order of magnitude estimate for the following items: 1) 12.5kW baseline Space Platform; 2) 12.5kW Second Unit; 3) 25kW spacecraft; 4) on-orbit growth equipment; 5) additional equipment; 6) Space Platform Ground System, ground station and ground operations. Equipment lists are included for the following: Electrical Power System; Thermal Control System; Structures and Mechanics; communications; Data Handling Subsystem; Attitude Control System; reboost module; payload rotation arm; Flight Support Equipment; payload chargeable equipment; and 12.5kW baseline extension arm. Mass summaries are also included for the Space Platform and growth equipment.</p> <p>This document is a memo from Ginn/EF22 to C.Cornelius/EE01, both of MSFC. The following is the content of the memo: "Subject meeting was held at MSFC, June 18, 1982, list of attendees attached. TRW personnel presented details of their revised Data System. TRW personnel stated that the new location shown for the S-Band omni antenna results in negative link margins, which will be corrected. No actions were assigned; system discussions and documentations interchange will continue."</p>	34444.006-004
	<p>This document is a report for the performance period from 8 May through 4 June 1982. The significant accomplishments performed under this contract during the period are as follows: costing of the Space Platform flight and ground segments was completed; preparation of material for the mid-term review was completed; thermal testing of the quarter-scale cold plate at Hamilton Standard was started; a contract was executed with the Vought Corporation for fabrication of a full-scale cold plate for structural testing; support was provided to the Space Platform End-to-End Study Working Group meeting at GSFC; and an assessment of Space Platform as the core element of a</p>	34444.013-023

82/06/18 manned space station was completed.

This document is a report requested by MSFC officials for a Rough Order of Magnitude estimate for the following items: 1) 12.5 kW BL SP; 2) 12.5 kW Second Unit; 3) 25 kW Spacecraft; 4) On-orbit Growth Equipment; 5) Additional Equipment; and 6) Space Platform ground segment, ground station and ground operations. Also included are task descriptions of the following items: ground segment; Pre-ATP engineering; Data Handling Facility; Space Platform Control Center; Payload Control Center; and Ground Support integration and test. Work schedules, equipment lists, and RDM costs are also included.

34444.006-005

82/06/21 This document is part of General Dynamic's response to NASA's RFP on the OTV. In this particular document, business management is discussed. Project control (financial control, schedule control, subcontract management & control, & coordination w/MSFC), key personnel, and new technology policies & reporting procedures are discussed. A cost proposal is also given. Conditions of cost are discussed (ground rules, description of cost estimating system, rates & factors). Rationale & supporting data are also given.

GDC-PIN-82-054

82/06/25 This document is a memo from Hooper/EL14 to L.E. Powell/PM01 through C.S. Cornelius/EE01. The contents of the short memo are as follow: " Mr. Pat Mooney of IBM presented the end-to-end command and data flow diagrams. The design treatment was comprehensive and all questions from the participants were answered satisfactorily. No actions were assigned, and no justified concerns were expressed during the meeting. Two primary points made by MDAC are: 1) PCC is used for short term archiving of data. For example, a PI cannot expect to retrieve his data a year later from the PCC. 2) Both PCC and SPCC have on-line real time systems/programs and also have off-line programs."

MSFC-MDAC-BSS

82/06/29 This document contains a summary of TRW's Alternative System Design Concept Study and emphasizes definition, understanding, and refinement of Space Platform mission requirements. The following is the organization of the report: 1) systems requirements and design, including provisions for growth and replacement of equipment and payload checkout; 2) payload accommodations; 3) operations, including Space Platform deployment and recapture by the Orbiter; 4) subsystem design, which discusses eight major subsystems (Electrical Power, Thermal Control, Attitude Control, Data Handling, Communications, Structures and Mechanics, Reboost Module, and the Flight Support Equipment. The document has pullouts which show the following subjects: outboard profile of Space Platform, summary of systems design, Space Platform payload requirements, payload physical accommodations, launch base operations, and build-up growth.

34444.000-004

82/06/30 This document is a memo from N.L. Binn to C. Cornelius concerning a subject meeting held at MSFC on 6/16/82. MDAC and Sperry Flight Systems presented details of the baselined Data System. The author summarized the results of the meeting: "No new issues were opened, no actions assigned."

MSFC-MDAC-MTR

82/07/01 This document establishes the design, performance, and verification requirements for a single solar array wing assembly. A single solar array wing constitutes one-half the power requirements for the SP. This document is presented in 3 parts, a main body and 2 appendices. The main body presents the common requirements (systems definition, characteristics, design and construction standards, logistics, personnel and training, interface requirements, verification, and preparation for delivery) and the appendices

LMSC-DB40454

82/07/01 present peculiar requirements of the SP SA as denoted by MDAC and TRW.

This document includes program plans, preliminary specifications, interface drawings, cost data, and schedule data for the MDAC SP. A prime emphasis is placed on the identification and mitigation of potential program risks. SP Power System configuration is examined (including CDMS, EPS, TCS, SMS, propulsion, FSE, & GSE subsystems & interfaces). Payload accommodations of the SP Power System (including services in astronomy, high energy, astrophysics, solar physics, space plasma physics, material science, environmental observations and life sciences) are covered. An overview of the Phase B Study is given. PS operations are discussed (including launch, orbital, mission, logistics, and verification). A summary of Phase C/D planning is also given.

MDC-H0108

This document is a preliminary (Phase B) system level requirements specification for the DHF, SPCC, and the PCCs of the SP. This document covers the GS mission requirements, summary of operational concept, external interfaces and detail system requirements of the DHF, SPCC, & PCCs. The primary purpose of the document is to provide a BL for developing, budgeting, and planning estimate of the GS for use by NASA. The document is not intended to be a definitive technical specification for the GS. The document is primarily functional specification to ensure a complete scoping of the hardware, software, and procedures/administration. Performance specifications are included where they are considered to be cost drivers. The document assumes that the DHF, SPCC, PCCs are new developments. The document also contains a spacecraft systems summary.

MDACB-33955-SP6SR

82/07/07 This document is a memo from Roy Currie to Luther Powell which enclosed the S&E comments to the MDAC and TRW study plans in response to Powell's request. Mr. Currie was Chief Engineer of the 25kW Power Module.

MSFC-SP-7/80

82/07/21 This document was designed as a guide to a meeting held 7/21/82 concerning the SP GS Study and is the Final Review. The document is divided by topic, with each topic having its own speaker at the meeting. Section 1 deals with general SP GS issues(e.g, scope, science support). Section 2 deals with SP GS requirements(system, SPCC, PCC, DHF). Section 3 deals with SP GS system deltas (DHF, SPCC, PCC). Section 4 covers SP GS trade studies(orbit support & science format). Section 5 covers SP GS design. Section 6 deals with SP systems engineering approach(requirements, basic steps, SP subsystems, documentation tree, & schedule). Section 7 covers SP GS operational staffing. And, Section 8 covers SP GS costing (guidelines, WBS, and schedule). All the information is enumerated in lists.

MDAC-33955-FR

82/07/22 This document is a letter, plus enclosures, which was sent from Sharples of TRW to L.E. Powell of MSFC on 7/22/82. The message contained therein concerned the Operations and Data Systems Splinter Meeting of 6/18/82 at which an agreement was made for TRW to redraw several charts which clearly showed SPCC functions from PCC function. The enclosures to the letter are the revised charts which were requested. The following is a list of topics dealt with in the charts, both SPCC & PCC have separate charts as stipulated: telemetry parameter processing & trend analysis; display processing; event & history processing; and, command safety.

SP-1345

82/08/01 This report documents the activities conducted as add-on activities to the "Alternate System Design Concept Study" during 6/82 and 7/82. The

MDC-H0126

DATE	ABSTRACT	ID NO.
82/08/01	activities included in the report cover the following tasks: 1)payload accommodation analysis; 2)flight operations analysis; 3)new component/mechanism development & testing; 4)update of design/operation baseline & cost; 5) space platform application to manned configuration; and, 6)space platform config cost. The specific tasks, findings, and appropriate action requirements are discussed. Space Platform Data Requirement Documents are reviewed and are with only one change (DR-6). Only minor adjustments have been made to the design, operations, and cost baselines previously reported.	
82/08/10	NASA has selected 8 companies for final negotiations leading to firm fixed-price contracts of less than \$1 million apiece for space station mission studies. These studies will aid development of specific mission requirements and architectural options. The eight companies are: Boeing, General Dynamics, Grumman, Lockheed, Martin Marietta, MDAC, Rockwell, and TRW. These contracted studies are to be the next step in planning activity for the station. The studies are to last for 8 months and are to identify and analyze scientific, commercial, national security, and space operational missions. Alternate concepts for the station will also be considered by the contractors.	MSFC Release 82-75
82/08/11	This document is a report accompanying a 6/82 meeting at which the following topics were discussed: 1)payload accommodations; 2)Ground/flight operations; 3)design analyses- new component/mechanism development & testing, port remind/cold-plate loads, and MDI reassessment; 4)cost review; and, 5) related IRAD-spacecraft viewing, radiator refurbishment, & neutral buoyancy testing. This program review concludes with the following summary: SP Phase C/D readiness has been further enhanced; numerous areas identified where additional study could be beneficial; and MDAC continues to support SP as initial step toward a Space Station. The document contains no formal text but relies on lists, charts, and diagrams for relaying its information.	MDAC8-33955-PR
82/09/13	MSFC has selected four aerospace firms for negotiations leading to contracts for exploring the early uses of the space station. Boeing, Martin Marietta, TRW, and General Dynamics were selected for the four contracts worth \$375,000 and will run for eight months. These studies will complement a concurrent mission analysis study managed by NASA HQ in Washington. Each contract addresses a particular area in which an operational manned facility would play an active role: Boeing- building large structures in space; Martin Marietta/TRW- servicing and maintenance of satellites; and, General Dynamics- OTV/space station relationship. The contracts will have the companies to examine what experiments need to be carried out with an early space station in order learn how to build and use most effectively a fully operational station by the end of the 1990s.	MSFC Release 82-82
	This document is a memo which was attached to a letter from E.H. Medler of TRW addressed to E.E. Beam of MSFC of 10/12/82. The memo itself was written by J.E. Davenport to Medler on 9/13/82. Three reference documents are referred to in the document: 1)IOC 82.SP6S-RCB-005,"Space Platform Ground Segment Tasks for Aug.&Sept.,"8/6/82; 2)"Space Platform Ground Segment Design Report," 6/17/82; and, 3)"Space Platform Ground Segment Design Report,"7/28/82. This memo documents the results of work defined by Reference 1 for the SP. This memo evaluates the impact of operations other than Free Flight Operations. Operations included are: SP integration, P/L integration, mission complement integration, orbiter integration, & post-flight operations. DHF,SPCC, & PCC are also considered. Section 2 presents command & data flow charts for applicable	SP-1371

DATE	ABSTRACT	ID NO.
82/09/13	operation phases. Section 3 presents the changes to the elements of the SS & some aspects of the SPC&DHS Simulator.	
82/10/01	This document has the objective of identifying the constraints & requirements of the STS & SP that should be accounted for in meeting P/L & proposed mission scenario requirements and to use the results of those evaluations to generate mission-planning guidelines for use in developing future mission scenarios. The results contained in this document are the culmination of the present effort as well as several earlier studies performed by TBE. Section 1 is an introduction. Section 2 identifies the typical candidate SP P/Ls used in the study. Section 3 discusses key characteristics of the SP/payload relationship and establishes guidelines for efficient utilization of the SP; items that are identified & assessed for their impact on SP utilization include timelining, ground coverage, flight attitudes, P/L science interaction, and resource considerations. Section 4 considers P/L-STs constraints & develops guidelines. Section 6 develops a sample mission scenario from candidate P/Ls.	SP82-MSFC-2623
82/11/01	This document contains the system requirements for a LEO manned SS that will operate with other complementary space systems. The req for the interfaces between the SS and other space sys that interact with the SS are included. These interacting elements include STS, orbiter transfer sys, unmanned platforms, free-flying satellites, & other related elements. General capabilities, development & buildup, initial capability, growth capability, & mission-specific req are discussed. Under general req the following are discussed: safety; maintainability; reliability; system life; sys autonomy; environments; sys verification; logistics; quality assurance; commonality; end of useful life disposal. Subsys described include: structures; EPBS; EPDC; ECLS; EVA support; DMS; C&T; docking/berthing; GN&C; OPS; habitability; TCS; HMF; fluid management. Operations req & SS information sys are also described. Appendix A: definition of terms; App B: natural environment design criteria; & App C: applicable documents.	MSFC-SSPDD-11-82-3
	This document is a report which attempts to provide certain basic guidelines and data to assist in the allocation of functions between humans and automated systems and for human/machine participation. The report describes the significant human capabilities and limitations and provides criteria and guidelines for various levels of automation and human participation. An appendix contains a collection of human factors data. SS systems and functions are classified. This document is the same as document #NASA-TM-82510.	NB3-19470
	This document is Book 3 of a 7-book set prepared by the JSC Systems Working Group. The document defines system requirements for a LEO Space Station that will operate with other complementary space systems to provide significantly increased effectiveness in support of a wide range of missions with objectives in science, applications, commercial operations, national security, & technology development. Also discussed in the document are the following which will be included in a SS: 1) facilities/services for science & applications; 2) a base for unmanned/manned orbital transfer systems; 3) facilities for dealing w/complex systems in LEO; 4) manned presence for developing space-based national security activities. Requirements for interfaces b/w & other space systems are included (e.g., STS, orbit transfer sys, unmanned platforms, free-flying satellites).	NASA-TM-82510
		MSFC-SSPDD-11-82-3

DATE	ABSTRACT	ID NO.
82/11/01	This document is identical with the document numbered MSFC-SSPDD-11-82-3; and, both documents have the same title.	JSC-SSPDD-SR/82
	This document portrays a summary of the products from the SS Systems Definition Working Group and is to provide a definition & characterization of options & trade study findings for SS architecture, configuration, subsystems, mission accommodations, interfaces, & related sys engineering concepts. Material is intended to be preliminary to define options, and to discuss trades underway or needed. The structure & sequential arrangement of sections is planned to provide a short synopsis of req from other SS working groups, discuss key issues subject to trades, to convey approaches & trades associated w/SS architecture, & to discuss overall sys definition including sys level trades & configuration options. Each subsys is discussed including options, issues, & trades. Final sections focus on P/L-mission accommodations, related flight sys, interaction with STS, launch vehicle options. Appendix provides summary listing of all trades identified.	MSFC-SSSD-11-82-5
	This document was produced through joint effort of NASA Centers & HQ but w/C. Darwin of MSFC in the lead and summarizes the activities of the SS WG. The document is to provide a definition & characterization of options and trade study findings for the SS architecture, configuration concepts, subsys., mission accommodations, interfaces, & related sys engineering considerations. The info is to be preliminary to define options, & to discuss trades underway or needed. The specific objectives of the document are as follows: to convey approaches/trades associated w/SS architecture; to discuss overall sys definition; to discuss each subsystem including options, issues, & trades; to focus on a detailed portrayal of SS P/L-mission accommodations, related flight sys, interaction w/STS, launch vehicle options, & SS technology/advanced development req. An appendix provides a listing of all trades identified. The document content develops the framework of the program, characterization of composite sys, and required capabilities.	MSFC-SSSD-11-82-5
82/11/15	This document is a midterm review report and contains information concerning the following study objectives: 1) creating user support for the SS; 2) identifying users in areas not contracted before; 3) to gauge the "potential user" climate in regard to SS start-up in five areas- science, applications, commercial, U.S. national security, and space operations; 4) defining user requirements; and, 5) to establish time-phased architecture for optimal development/integration/operation of a SS. Three study tasks are discussed in the report: Task 1- mission requirements, NASA & DOD; Task 2- mission implementation concepts; and, Task 3- cost and programmatic analysis. This document contains no formal, written text but utilizes lists and charts to relay information.	LMSC-NAAO-MTR
82/11/16	This document is a briefing manual used at a MMA mid-term review meeting. The following are the topics for discussion on the agenda: Mission requirements- user mission reqs. development, astronomy/space physics/planetary, solar physics/Earth observations, communications/life science/materials processing/commercial, SS and user req., and accrued benefits; mission implementation concepts; cost, schedule, and benefits; and, DOD tasks. Under mission implementation, the following candidate program options are examined: A) single manned SS plus unmanned platforms & B) two manned SS plus unmanned platforms. The document contains no formal, written text but utilizes charts, graphs, diagrams, and lists to relay desired information.	SQC-SE-02-01

DATE	ABSTRACT	ID NO.
82/11/16	This document is briefing manual used at a MDAC mid-term meeting re SS. The following is a list of topics included in the agenda: mission req.- methodology, user interaction, S&A missions, and commercial missions; programmatic- funding model, element costs, program costs; mission implementation- methodology, architectural options, & Strawman program; and, national security missions-DOD tasks. This document contains no formal, written text but in its stead utilizes charts, lists, and diagrams of various types.	MDC-H0145
82/11/17	This document is a large briefing manual prepared for a Grumman SS mid-term briefing. Topics for discussion on the meeting's agenda are as follow: Mission requirements approach; commercial missions and benefits- telecommunications, industrial services & solidification processing, & biological processing & remote observation; Science & Applications Missions & benefits- life science & Earth observation/environment & astrophysics solar terrestrial & planetary; technology development missions; SS reqs; mission model development; user alignment activities; architectural approaches; and, national security missions- study approach, R&D support missions, & command center & communication missions. Conclusions of the study are as follow: By adding SS to STS manned mission duration barrier is removed, P/L capabilities are multiplied, & STS concentrate on transport role; SS benefits arise thru presence of man & other elements in space. No formal text, but uses lists/charts.	SA-SSP-RP002
82/11/18	This document is a large briefing document supplied by TRW for a mid term review in 11/82. The agenda for the meeting included the following topics: executive summary, mission reqs, mission implementation/architectural concepts, cost & program analysis, and DOD/national security issues. Under mission reqs the following issues are addressed: S&A missions, commercial missions, space operations, preliminary mission models, & preliminary SS reqs. Under mission implementation the following are addressed: define/analyze alternative sys attributes & characteristics, & program options to accommodate user reqs; define architectural elements; conduct trade studies; define architectural options; define evolutionary concept alternatives; and, recommend development & evolution plan. Under cost & program analysis these accomplishments are listed: cost-benefits analysis review activities; Johnson hardware cost model developed; &, top-down annualized cost model developed. App. A lists SS science objectives.	TRW-3681-MTR
82/12/01	This document is a report which documents the results of E&D Subsystems Definition Study, the functions requirements of the SS, the subsys organization, and the subsys interfaces. Also included are recommendations for the future. Section 3 deals with SS required functions, e.g., electrical power functions, SA deployment/retraction, EVA position management, or P/L management. Section 4 outlines Partitioning Criteria which will serve to form relatively independent operational elements (subsys) of the SS system. Table 4-1 gives those criteria. Section 5 deals with subsystem development. Table 5-1 lists the subsystems. Section 6 is concerned with the definition of interfaces. The results of this study have been used in other studies. The study in particular helped those conducting the study in understanding distributed functions and their implications to the nontraditional aspects of the system.	JSC-18740
82/12/13	This document contains a number of assertions related to SS system that reflect the current state of knowledge within SS program. These assertions are recorded in Sections 3,5, & 6 and define the boundaries w/in which SS will evolve over time w/the addition of new technology w/in the existing SS & the addition of any new modules to the initial station to satisfy changing mission	MSFC-SSPDD-12-82-1

DATE	ABSTRACT	ID NO.
82/12/13	<p>requirements over the life of the SS. These assertions are made so as to stimulate debate which will aid in making decisions re SS. Section 3 involves: SS system requirements & characteristics, including mission-specific reqs, user interface reqs, sys reqs, subsys reqs, operational reqs, development reqs, & element interface reqs. Section 5 deals w/candidate SS Program Architecture, including strawman architecture, SS design considerations, & key subsys characteristics. Section 6 deals w/ SS Program operational environment, including SS operations, mission operations, user operations, & ground operations.</p> <p>This document is the "Introduction and Summary" book of a 7 book set of the SS Program Description Document (PDD) or "the Yellow Books." The PDD provides a focus for the agency SS activities & a vehicle to define a SS program with full agency support. This book contains summary info on the following: mission description; sys req & characteristics; technology & advanced development programs; candidate SS program architecture; program operational environment; and SS program planning. The other volumes in the series are: Book 2 - Mission description; Book 3 - System Requirements; Book 4 - Technology Options and Advanced Development; Book 5 - System Definitions (System Trades & Performance Envelope, Architecture, & Configurations); Book 6 - Space Station Operations; Book 7 - Program Planning (Management Structure, Procurement, & Cost/Schedule. Also a background of events leading to study and development of a SS is given.</p>	MSFC-SSPDD-12-82-1
82/12/14	<p>This document is a monthly report from the Johnson E&E Center to MSFC concerning its activities from 11/13/12/14 1982. The report chronicles several experiments run with the F-104 flight experiment package using the Deere iron as samples. Conclusions were made re cooling rates. Report is made of improvements being made in the experiment package. Other activities during the report period include correlating helium flow rates w/the amount of quartz fiber insulation.</p>	UAHB-34530-SR-9
82/12/18	<p>This document is briefing material used in a mid-term study review of Space Station. The following are included on the agenda: science and application missions; technology demonstration missions; space operations missions; and, national security missions (which are included in a classified addendum). The following are also included: architectural options; physical characteristics; key environmental interfaces; platform requirements; crew interfaces; science missions instruments; payload requirements; life sciences; use of man; configuration; commercial missions--earth observations, materials processing, and communications; and the Orbital Transfer Vehicle. This document contains no written text but utilizes charts and lists to relay information.</p>	D180-27305-1
83/01/01	<p>This document & NASA TM 82501 are a compendium of up-to-date info on the physical characteristics of bodies in the solar system. Use is intended for NASA engineers, scientists who design spacecraft & space experiments, and for other interested parties. These guidelines are recommended as a tool for use in development of space vehicles & associated equipment, & the info presented is based on data & models currently considered accurate. Sections on the Sun, Terrestrial Space, the Moon, Mercury, Venus, and Mars constitute Volume 1. Volume II contains chapters on Jupiter, Saturn, Uranus, Neptune, Pluto, Comets, Asteroids, and Interplanetary dust. Specifically, info is provided in the disciplinary areas of atmospheric & ionospheric properties, radiation, geomagnetic field, astrodynamic constants, & meteoroids for the Earth's atmosphere, interplanetary space, & the atmospheres & surfaces of the Moon and planets other than Earth. The current MSFC upper atmosphere model is described in detail.</p>	J8400087

DATE	ABSTRACT	ID NO.
83/01/25	This document corresponds with document #ICD-GPS-200. This is an Interface Control Document and it defines the requirements related to the interface between the Space Segment of the Global Positioning System (GPS) and the Navigation User Segment of the GPS.	J8400015
83/01/28	This document corresponds with document #JSC-08060 Rev. D. This document is a specification and is of broad scope and covers all phases of pyrotechnics, including design, development, qualification, & production. It also contains reqs & guidelines from the functional sys level to those related to specific pyrotechnic devices & components thereof. Control avionics & circuitry, GSE, launch accessory sys, Orbiter, ET, SRBs are covered. This specification is applicable to all Space Shuttle pyrotechnic activities, including NASA Centers, their contractors, subcontractors, & suppliers engaged in these activities, including design, development, qualification, production, acceptance, and user of pyrotechnics. P/L pyrotechnics are not subject to the reqs contained herein.	J8400004
83/02/01	The purpose of this document is to define the detailed procedures for preparing Standard Materials Worksheets. The worksheets will be used to identify, evaluate, and track all materials, both metallic and nonmetallic, used on JSC supplied equipment for the Orbiter, manned test articles, & applicable GSE. Tables 1 & 2 of this document contain a list of all materials rated to the req of SE-R-0006B. These ratings will be used in preparing the standard worksheets. In addition, the suppliers of Shuttle equipment should use this list of materials as the selection list for design of hardware. This document is to be used by suppliers of GFE as a guideline in preparing Standard Materials Worksheets for reporting material usages.	JSC-09604
83/03/02	This document contains a memo from J.L. Wright to R.E. Sharples of TRW. The memo tells of the document which is attached to the memo and says the following: the attached document is a survey of potential tether applications associated with a SS or the STS. An analysis of using tethers for orbital transfer is made. The document includes brief discussions of all known proposed uses of tethers for Earth orbit operations. The dependence of applications upon practicality(cost) of engineering solutions and a willingness to cope with some attendant operational constraints is also considered. The following is a list of applications of the tether system covered: tether basics; tethered satellites; transfer tether; orbit transfer; stabilization; artificial gravity; electrical power generation; stationkeeping; energy storage; antennas; large structures applications; and implementations.	TRWB-33956-TA-83
83/03/08	This document is a report which presents the capabilities & development costs of several scenarios that can be pursued in the fulfillment of US space goals over the next decade. There are four scenarios examined: 1) use of the currently planned STS & the development of free-flying satellites, also considered are power extension packages to extend shuttle time in orbit; 2) development of unmanned platforms to augment current assets & to provide utility support for P/Ls; 3) development of an evolutionary incrementally developed SS that is currently congruent w/NASA's development plan (w/ manned & unmanned elements, TMS); 4) development of a full capability SS that would satisfy all of the national requirements envisioned for the next decade. For each scenario development costs are derived & are given at a gross level. Cost estimates are presented in 1984 dollars and include the design, development, and production of the unmanned satellites, SPs, SSs, and OTV.	NASA-SSPOC-3/83

- 83/04/01 In this document, functional requirements, performance requirements, key issues, & architectural considerations related to a SS end-to-end data system are described. The end-to-end data sys is considered to be the hardware, software, personnel, & procedures that allow a ground-based user to control & acquire data from his space assets that are part of the SS system. The roles of automation, reconfigurability, standard user interfaces, and advanced technology utilization are emphasized. Early understanding & definition of the functional allocation between the in-orbit facility and the ground segment and between the core SS system and the user systems are the key issues. MDC-H0539
- This document assesses the market, performance needs, & cost effectiveness of a reuseable OTV versus an expendable alternative, & defines the resulting req placed on the SS. The traffic model utilized, along with its data which was extrapolated to the year 2000, resulted in the req to deliver to GEO P/Ls of various weights. To accommodate this GEO traffic model, alternative OTV concepts were defined & evaluated for their cost effectiveness (expendables-PAMs, IUSs, cryo-stages & reuseables- single stage, two stage, & aerobrake). The cost effectiveness of ROTV is examined. A TMS system is examined & found to be an essential in enabling a diversity of applications (deploying & retrieving P/Ls for servicing, aiding in structural assembly, & berthing mission vehicles). Preliminary req for RMS, berthing, & propellant storage are also included. MDC-H0535
- This document is a report which describes the approach, study results, & MDAC recommendations for defining & selecting SS architectural options. This effort is a subtask of Task 2, Mission Implementation Concepts. SS architecture, as used in this report, is defined as the arrangement of elements (manned & unmanned on-orbit facilities, shuttles, OTVs), the number of these elements, their location, & their functional & performance capability. Key capabilities are listed for crew size, power, data rate, pressurized volume, number of & function for external ports, & resupply req. Several possible mission scenarios were identified based on the needs of specific mission categories & priorities. 88 missions are defined with 44 separate parameters, & this body of data establishes the functional & capacity req for the architectural options. A mission req summary, architectural options, mission emphasis architectures, & architectural variations are examined. MDC-H0537
- This document is a report which discusses S&A missions as part of Task 1 (mission req) of the SS Needs, Attributes, & Architectural Options Study. It describes the S&A Missions Model for the SS & its derivations. A set of 57 S&A missions have been defined for this study in the following areas: solar & astrophysics, communications research, earth environment, life sciences, materials processing. These missions will address basic questions of science which profit from on-orbit measurements & observations and also better utilization of the earth's resources & environment to society's benefit (by aiding communications, production of new goods, controlling Earth's environment). P/L, manpower, & power req were outlined. Conclusions include: inclusion of Early/High Value mission set; 2 facilities (1 at 28.5 manned & other at 57,90 either manned or unmanned). MDC-H0531
- This document is a report which outlines the principal cost results derived from the SS Needs study. The determined costs were those of Architectural Options defined to satisfy Mission Reqs developed w/in study. A major feature was the consideration of realistic NASA budget constraints on the recommended architecture. Thus, SS funding reqs were adjusted by altering schedule until they were consistent w/ current NASA budget trends. Architecture MDC-H0541

83/04/01 resulting from the study includes an initial SS estimated to cost \$5.2 billion, with a maximum annual funding req less than \$1.4 billion. The costs of expanded capability were indentified. Identified funding reqs included: consideration of non-contractor costs such as NASA program support, contingency, & operations. The MDAC Program Definition Cost Model was the primary tool for determining program cost. The computerized model is described in the document.

This document is a summary of the study of SS needs, attributes, and architectural options and covers all major topics addressed in the study except national security missions (which were reported to DOD). The study has produced a detailed mission model which identifies the principal needs of representative missions in all mission categories listed. The major social, economic, cultural, technological, commercial, & scientific benefits of each mission have been evaluated. Various mission scenarios have been studied, as well as architecture. For each, total program costs & schedules have been generated. The following are briefing topics listed: 1) mission needs (S&A, operations, technology, commercial); 2) mission benefits & prioritization; 3) requirements for SS facilities; 4) Architectural options vs. mission scenarios (prioritized mission model, S&A emphasis, operations & technology emphasis, commercial emphasis); and, 5) program costs & schedules. An assessment of OTV was also made.

MDC-H0180A

This document is briefing material used to show the results of MMA's study of SS needs, attributes, and architectural options. The following is a list of topics given attention: time phased mission requirements & attributes; program evolution; SS architecture; key technologies; and, associated costs & benefits. Summary conclusions were: 1) SS offers economic & performance benefits; 2) SS is affordable w/in NASA constraints; 3) STS required support is w/in current fleet capabilities; 4) early manned presence in LEO station is justified for maximization of performance & benefits; 5) a single SS at 28.5 degree inclination supports 80% of user missions; 6) early SS architecture should include a reuseable OTV w/aerobraker, TMS w/telepresence servicer, OTV/TMS refueling & servicing capability, & attached research labs (life sciences & MPS).

SOC-SE-02-02

This document is the fourth volume of the Final Report for the Advanced Platform Systems Technology study and it provides the Technology Advancement Program Plans for the critical of high priority technology items identified in the system trade studies. The overall effort proceeded from the identification of 106 technology topics to the selection of 5 for detail trade studies. The technical issues and options were evaluated through the trade process. Finally, individual consideration was given to costs and benefits for specific technologies identified for advancement.

D180-27487-4

This document is volume II of the final report on the Advanced Platform Systems Study conducted for MSFC by Boeing and Spectra Research Systems. The study objective was to identify, prioritize, and justify advancing high leverage technologies for application on the early Station. The goal was fulfilled through a systematic approach to trade study identification and selection, trade study analysis, and selection of technology advancement items. This volume presents the results of the technical effort. The study effort proceeded from the identification of 106 technology topics to the selection of 5 for detail trade studies. The technical issues and options were evaluated through the trade process. Finally, individual consideration was given to costs and benefits for the technologies identified for advancement. Eight priority technology items were identified for advancement and are reported in this volume

D180-27487-2

83/04/01 together with the rationale and justification for their selection.

This document is volume III of the final report on the Advanced Platform Systems Technology Study conducted for MSFC by Boeing and Spectra Research Systems. The overall study objective was to identify, prioritize, and justify the advancement of high leverage technologies for application on the early Space Station. The objective was fulfilled thru a systematic approach to trade study identification and selection, trade study analysis, and selection of technology advancement items. This volume presents the formatted data sheets that were filled out as part of the study procedure.

D180-27487-3

This document reports on the analyses of the total mission data base, which was constructed from inputs generated by engineers cognizant of each mission area, and the resultant req that were extracted & combined from these missions. Individual mission areas are analyzed & reported in separate reports of this study. The benefits analysis technique was used to prioritize the great number of missions and allowed overall & orderly comparisons of missions accomplished, architecture needed, & budget req. The majority of missions seem to require a manned SS at 28.5 degree inclination, along w/SP at polar orbit. Req for evolutionary growth of each of these SS sys elements, & for augmentation at other locations, were determined. The techniques employed provided a reasonable req definition. They also demonstrated capabilities that could be applied in future endeavors in areas of user involvement, computerized data base, benefits analysis techniques, mission prioritization, & req integration.

MDC-H0533

This document reports study findings re technology developments & missions. Discussion includes: Subsystem technology trends (EPS, DMS, ECLS, TCS, structures & materials, ACS, C&T, mechanism technology, auxiliary propulsion, & limiting technologies); technology development mission description (subsys technology missions and mission technology missions). Included in the latter are: ECLS waste water recovery, laser C&T, tether dynamics mission, LSS construction, man's role in space, EVA capability technology mission, crew/manipulator controls, fluid storage & management mission, OTV servicing technology, satellite servicing technology, and zero-g Antenna range. The purpose of technology development missions is to develop advanced SS capabilities by providing on-orbit testing of technology for SS growth applications and generic missions & P/L equipment for future mission applications.

MDC-H0538

This document reports the examination by the MDAC study team of the benefits which the SS enables in the subsequent conduct of missions. The BL set of 90 missions (the most likely of SS missions) were assessed collectively & individually in terms of the economic, performance, & social benefits to be accrued & expected from the conduct thereof. An overview of these factors is provided. Such provision gives an ordered set of missions that can be sequentially accommodated by a SS sys that would increase in capability to a given budget limit. The study team which compiled the results of this study were experts in areas of commercial, operational, S&A, & technology missions. The following were questions & issues addressed: mission which result in substantial benefits; high "added value" missions; SS enabling missions; risk & mission confidence; constituencies & special interest groups; demographic impacts; and, constituencies w/ongoing programs.

MDC-H0534

This document summarizes the work performed on the Advanced Platform

D180-27487-1

83/04/01 Systems Technology Study for MSFC by Boeing and Spectra Research Systems. Volume I is a condensation of the material reported in the Trade Study and Technical Selection Technical Report (vol.II) and the Technology Advancement Program Plan (vol.IV). Volume III contains the support data. The four volumes make up the study final report. The overall study objective was to identify, prioritize, and justify the advancement of high-leverage technology areas required to enable or enhance development of an early Station. The emphasis became focused on those items needed for an early manned Space Station having a 1986 start date.

This document takes as its point at issue the establishment in every system context the optimal role of each component in the man-machine system. The criteria used in optimizing a sys design include performance req, cost, & risk. Some sys operational req specify performance beyond human sensory or psychomotor capabilities. Some sys operational req are of such low demand that development of automated sys becomes prohibitively expensive in view of the benefits achieved. The risks associated w/the consequences of failure in some critical sys dictates the need for human maintenance, servicing, & repair to ensure the highest possible degree of reliability. A brief summary of human capabilities & limitations in space, the current status of robotic sys, the optimum division of labor b/w manned & robotic sys, & some thoughts on the proper criteria to use in task allocation are presented in order to help in making a decision concerning manned performance relative to machine performance.

MDC-H0536

83/04/05 This document is a final briefing used for a presentation of study results re A Study of SS Needs... . The following is a list of tasks undertaken & consequently covered in the presentation: identify SS missions (S&A, commercial, national security, space operations); analyze mission data (man's role, orbit, resources); assess realism (cost/funding, technology, alternatives, progressions, time phasing); define system architecture (compatibility, priorities, platforms); define required SS capabilities (cost/funding, technology); define SS evolution (funding level, technology/benefits payoff); and define program costs & benefits (options, commercial involvement, SS prospectus). Major conclusions of the study include: initial SS should be joint effort of R&D, production, operations, & servicing facility at 28.5 degree inclination; OTV capability is major economic justification for a SS; cost of IOC SS is \$5.5 billion, full capability is \$6.3; realistic opportunities exist for private investment. See document #6DW-3682-SD.

6DW-3682-FB

This document is another in the series of documents reporting LMSC's findings in SS Needs, Attributes, and Architectural Options Study. This volume deals specifically with Tasks 2 & 3 of the study, mission implementation concepts & cost. The following are addressed under the heading Mission Implementation Concepts: mission scenario analysis & architectural concepts; alternative system concepts; mission operations architectural development; architectural analysis trades; evolution; configuration; technology development. The following are addressed under the heading Cost and Programmatic Analysis: benefits and cost, schedule, & funding.

LMSC-0889718

This document is volume 6 of a 7-volume set, and it is the final executive review of the study under consideration. The agenda of specific issues given consideration are: 1) identification and validation of missions; 2) benefits of man in space; 3) needed attributes and overall architecture; 4) requirements imposed on Station; 5) architectural options; 6) technology selection; and 7) program planning (cost and benefits, risk and cost avoidance). The concluding remarks of this final review are: role of man in space can be clarified,

D180-27477-6

83/04/05 specified, and quantified; a first detailed approximation was made; benefits can be real; practical, cost-effective architectures identified; and definitive and comprehensive program planning required to actualize benefits. This document contains little formal, written text but utilizes lists, charts, and graphs as the means of relaying information.

This document presents the conclusions to a SS study designed to examine user needs/mission requirements, architecture/mission implementation, and, program costs & benefits. The following is a summary of the results of the study: 1)an evolutionary manned SS at 28.5 degree inclination is recommended; 2) SS is to be augmented by SPs in 28.5 degree & polar orbits; 3)resource module of the SS to to have high commonality w/SP; 4)initial cost through 1990 is to be \$5.4 billion (1984 dollars); 4)peak year funding is \$1.3 billion (1984 dollars); 5)steady state net benefits of SS exceed O&M costs by \$1.8 billion per year by the year 2000 (in 1984 dollars); 6)the largest SS benefits derive from high STS load factor (65% to 82%) enabled by the SS; and, 7)significant SS benefits arise from basing of ROTV and servicing GEO satellites.

TRMM-3681-FRESB

83/04/06 This document is a report of Rockwell's findings in the SS Needs... Study. The following is a list of topics covered in the summary: recommended program architecture; missions & requirements; programmatic evolution; space station architecture, technology, and cost; and, space station attributes and benefits. A list of conclusions arrived at in the study is also given: 1) a SS located at 28.5 degree inclination provides services to all users; 2)initial 4-man SS in 1991 growing to an 8-man SS in 1994; 3)TMS space based with initial SS & perigee kick stage, reuseable cryogenic OTV space-based with growth station; 4)the most important SS benefits arise from future missions enablement; and, 5)significant cost reductions occur for all services.

SSD83-0037

83/04/07 This document contains no formal, written text but utilizes charts, graphs and diagrams to relay information. The document is divided into 3 sections and each deals with the following: 1)Program Options- mission scenarios, SS concept, core SS building blocks, cost comparisons, STS launch summary, OTV; 2)Architecture- development of evolutionary SS, mission services/ support, facility services, architecture req, crew accommodation, logistics resupply, subsystem req, time phased mission P/L, module concept, standard mating port, floor arrangement, energy section, P/L service assembly concept, space science platforms, architecture options; 3)Subsystems & technologies- pathfinder concept, EPS req, SA concept, TCS, ECLSS, Information Management and C&T subsystems, GN&C, Reaction Control & Fluid System. Also an evaluation of technology improvements is given.

SSD83-0044

83/04/09 This document is briefing material which describes the results of Grumman's study of SS Needs, Attributes, & Architecture. The following is a list of specific topics covered in the document: architecture, subsystems, data management (GE), and communication (CONSAT GEN). Also given are three steps used to illustrate the approach used to define SS architecture and its evolution. In step 1, architectural & subsystem requirements were derived. In step 2, configurations that satisfy the requirements were developed. In step 3, system evolution alternatives were defined.

SA-SSP-RP009

83/04/11 This MSFC News Release relays NASA's announcement that President Reagan asked the Senior Interagency Group for Space to conduct a study to establish the basis for an Administration decision on whether to proceed with

MSFC Release 83-24

DATE	ABSTRACT	ID NO.
83/04/11	NASA development of a permanently based, manned SS. The interagency group was headed by William P. Clark, Asst. to the Pres. for National Security Affairs. The group was to consider four example scenarios of possible approaches for the continuation of US manned space program, following completed development of the Space Shuttle. The scenarios are: 1) Shuttle & unmanned satellites; 2) Shuttle & unmanned platforms; 3) Shuttle & an evolutionary SS; and, 4) Shuttle & a fully functional SS. Issues to be discussed included: how a manned SS would contribute to maintenance of US leadership in space and how foreign policy & national security issues would be affected. A working group, chaired by NASA & including State Dept. & DOD, will make a report to the Interagency group & the President.	
83/04/15	This document involves itself with the objectives of a Task A study which was designed to study potential production rates & project cost savings achieved by converting the current conventional machining process in manufacturing Shuttle ET panels to HSM techniques. Savings were to be projected from the comparison of current production rates with HSM rates & w/ rates attainable on new conventional machines. The HSM estimates were also to be based on rates attainable by retrofitting existing conventional equipment with high-speed spindle motors & rates attainable using new state-of-the-art machines designed & built for HSM. The goals of Task A were: investigate current machining techniques; compare current production rates & costs to projections based on retrofitting present equipment to HSM, on new HSM equipment, & on new conventional equipment.	LMSC-D059404
83/04/18	This document is an overview of the Study of SS Needs,... and the following is a list of tasks undertaken & consequently covered in the overview: identify SS missions (S&A, commercial, national security, space operations); analyze mission data (man's role, orbit, resources); assess realism (cost/funding, technology, alternatives, progressions, time phasing); define sys architecture (compatibility, priorities, platforms); define required SS capabilities (cost/funding, technology); define SS evolution (funding level, technology, benefits/payoff); and define program costs & benefits (options, commercial involvement, SS prospectus). Conclusions of the study include: initial SS should be joint effort of R&D, production, operations, & justification for SS; cost of IDC SS is \$5.5 billion, full capability is \$6.3; realistic opportunities exist for private investment. This document is comparable to document #6DW-3682-FB with only a few minor differences.	6DW-3682-SO
83/04/21	This document is Part A of Volume 7 of a 7-volume set and it is a Data Book covering topics in architecture, technology, and programmatic. Included are compilations of Mass Statements, a Space Station Habitability Report, data concerning the data management system, data concerning communication and tracking and data concerning environmental control and life support.	D180-27477-7
	This document is Part B of Volume 7 of a 7-volume final report and it is a Data Book covering topics in architecture, technology, and programmatic. The following are topics specifically covered: remote manipulators, instrument pointing systems, external radiators, and interface requirements and standardization. Appendices are also included in this volume and concern the following: 1-summary of study tasks and Final Report Topical Cross References; 2-list of key team members; and 3-list of acronyms and abbreviations.	D180-27477-7
	This document is the executive summary to a study report carried on in order to aid NASA in making a decision whether or not to continue with a Station	D180-27477-1

83/04/21 program. This summary addresses the following issues: identification and validation of missions (who are the users?, what are their needs?, what are the benefits of a Station?); benefits of man in space (what is man's role and does manned presence justify a Station?); needed attributes and overall architecture; Station requirements (what are time-phased mission and system requirements?); selection of orbits; Station architectural options (which are attractive?); technology selection (what technologies should be incorporated into the initial Station and how can technology advances be provided for?); and program planning (cost and benefits (what is the range of program life cycle costs? and how can risk be controlled and unnecessary cost avoided?). Appendices: 1-summary of study tasks; 2-key team members; 3-acronyms. This is volume 1 of 7 volumes.

This document is volume 3 of a 7-volume final report on the Space Station Needs, Attributes, and Architectural Options Study. The objectives of this document are to present a typical system specification format and to compile requirements not previously published. This document contains the systems requirements for a low Earth orbit Space Station which will operate with other complementary space systems to provide effective support to a wide range of missions with objectives in science, applications, commercial operations, national security, technology development, and overall space operations. The requirements for interfaces between the Station and other space systems which interact are included. These interacting elements include the Space Shuttle, an orbit transfer system, unmanned platforms, free-flying satellites, and other related elements. Appendices contain a summary of the study tasks, lists of key team members, and acronyms and abbreviations.

D180-27477-3

This document is volume 4 of a 7 volume final report which includes reports on 1) architectural options, 2) habitability considerations and subsystem analyses, 3) technology, and 4) programmatic. The architectural options section presents the methodology employed for conceiving and defining Station concepts. As a result of this approach, architectures were conceived and along with their supporting rationale are described within this portion of the report. Habitability considerations and subsystem analyses describe the human factors associated with Space Station operations and includes subsections covering data management, communication and tracking, environmental control, manipulator system, resupply, pointing, thermal management, and interface standardization. The technology section of this report presents a consolidated matrix of subsystems technology issues as related to meeting the mission needs for a 1990s era Space Station. A brief description of costing and program strategies is outlined.

D180-27477-4

This document reports on Space Station user mission analyses that were conducted during this study. This is volume 2 of 7 volumes. This volume presents summaries of the results of mission analyses, and as a result the reader is directed to consult Data Books for detailed discussions and data. Section 3.0 contains the results of various mission analyses. 3.1 discusses the science missions (solar physics, space science, astrophysics, earth observation, life sciences, & materials science). 3.2 contains the results of the commercial missions analyses (materials processing, communications satellites, and Earth observation). 3.3 discusses technology missions. 3.4 discusses space operator missions (construction, satellite servicing, and flight support). 4.0 describes time-phased scenarios of operational capabilities. 5.0 gives the integrated requirements derived from the mission analyses results. Section 6.0 gives the results of the benefits analysis.

D180-27477-2

DATE	ABSTRACT	ID NO.
83/04/22	<p>This document gives detail concerning the SS Needs, Attributes, & Architectural Options Study conducted by LMSC. The following were the objectives of the study and consequently examined in this summary: 1)to create broad based user support for the SS; 2)to gauge the potential user readiness for SS start-up in 5 areas (science, applications, commercial, US National Security, & space operations); 3)to provide potential users w/knowledge of services & potential benefits of SS system; 4)to identify & to define user requirements that will drive the SS design; 5)to identify & to characterize SS system attributes & capabilities to meet user requirements; 6)to establish evolutionary architecture for development, integration, & operation of a SS sys; and, 7)to establish cost estimates for evolutionary SS concepts, & socio/economic benefits. Three major tasks are outlined in the report: mission requirements, mission implementation concepts, and cost & programmatic analyses.</p>	LMSC-D889718
	<p>This document is a compilation of supporting data & analysis reports for the study of SS needs, attributes, & architectural options. The following are examined in the report: reference SS evolution, contact list, data base, scenarios, commercial report, TMS, life sciences & life support development experiments on a SS, the SPAR Report, and Hamilton Standard.</p>	LMSC-D889718
	<p>This document is a compilation of supporting data and analysis reports concerning the LMSC study of SS needs, attributes, and architectural options. The following is a list of topics given consideration in this volume: architectural impact analysis, configuration concepts evaluation, Cadam Drawing File, EVA Technology Needs, and Manned System Technology Requirements.</p>	LMSC-D889718
	<p>This document is a report which briefly examines the roles of government & industry in commercialization of space, describes a methodological approach for stimulating the interests of potential users, presents several illustrative examples of potential commercial developments, discusses the role of manned space sys in space commercialization, & describes some of the issues & opportunities that are likely to be encountered in the commercial exploitation of the unique characteristics of space. The results of the study herein summarized suggest that interest in space facilities can be found among a number of commercially-oriented users. The following are examined: space manufacturing; space communications; remote sensing; launch & orbital transportation; satellite servicing & operational support missions; development & verification services; obstacles & incentives to commercialization. Appendices: 1-Typical Confidentiality Agreement; 2-5 Potential Missions; 3-User Contact List.</p>	MDC-H0532
	<p>This document is a report which presents the results of a study to determine SS needs, attributes, and architectural options that affect the future implementation & design of a US SS system. This document presents results in the following context. An understanding of SS needs was developed thru personal contacts w/potential users. Requirements were established for several mission scenarios, a number of which could benefit from the continuous presence of man in space. One mission w/considerable interest & support is the National Orbiting Command Post. Reqs for candidate missions were used to define functional attributes of SS. A reference SS configuration was selected & an evolutionary plan was developed that increases SS capabilities. Configuration analyses were carried on to help in making budgetary cost estimates. Three major tasks were outlined: mission requirement, mission implementation concepts, & cost & programmatic analysis.</p>	LMSC-D889718

83/04/22 This document is a responsive proposal from Boeing to MSFC per MSFC's request which was made known in MSFC Letter AP3SC40-83. Important lessons based in the study include: a detailed procedure for screening and selecting potential Large Space Structures technology development missions is mandatory; recognition and analysis of technology, system, and subsystem interrelationships is essential; the analysis must be conducted by experts intimately aware of the state of the art in each technology; and close coordination between NASA and Boeing will greatly enhance the study results. This is Folder 1 of a 2-folder set. D180-27638-1

This document is a responsive proposal submitted from Boeing to MSFC per the request of MSFC Letter AP3SC40-83. The contents of this document cover the following topics: study management; workload distribution; administrative data; and, other factors (company interest, small disadvantaged businesses, and equal employment opportunity). This document contains an appendix which contains cost estimates. This document is Folder 2 of a 2-folder set. D180-27638-2

This document is an executive summary of the above named study. The study's objectives were: to create broad based user support for SS; to gauge the potential user readiness for SS start-up in 5 areas (S&A, commercial, national security, space operations); to provide potential users w/knowledge of services & potential benefits of a SS; to identify & to define user req that will drive the SS design; to identify & characterize SS sys attributes & capabilities to meet user needs; to establish evolutionary architecture for development, integration, & operation of SS sys; and, to establish cost estimates for evolutionary SS concepts & socio/economic benefits. SS evolution is described. Under Science missions, physical & life sciences are considered. Under commercial activities, the space production of drugs, alloys, sensors, utility services are examined. Military benefits of SS are also considered. LMSC-D889718

This document is another in the series which deals with SS study on needs, attributes, and architectural options. This volume emphasizes mission requirements. User alignment is discussed, including user contact, user interaction, & conclusions. Science & Applications, including physical & life sciences are discussed (SS uses, benefits, user needs, SS scenarios, reasons for research in space, experiment reqs, strawman for research facility, architectural considerations, HMF, radiation, shielding, artificial gravity are included here). Commercial reqs are discussed (reasons for research in space, benefits, MPS, the influence on US economy, strategies for space industrialization, investment criteria are included). National security missions are discussed: future military missions, potentials, benefits, oceanographic observatory development. Space Operations are covered: on-board & remote, constraints imposed by orbit mechanics, free-flyers, tethers, LEO & GEO satellites. Space Telescope is also discussed. LMSC-D889718

This document is the executive summary which presents the major study results & conclusions of a study assigned to Gen Dyn in order to identify, collect, & analyze the S&A, commercial, technology, National Security, and space operations missions that require or will materially benefit from the availability of a permanent manned presence in space, and from these findings, to identify and characterize SS attributes & capabilities necessary to satisfy these mission requirements. Results & conclusions are supplied for the following area which were studied: Mission requirements; mission implementation options; economic benefits, costs, & programmatic; and, national security missions & analysis. GDC-ASP-83-001

DATE	ABSTRACT	ID NO.
83/04/22	<p>This document is the report concerning the Mission Requirements Analysis of the SS. Findings were to be used as a basis for the SS architectural option studies & related benefits, costs, & programmatic evaluations. The following were the types of missions considered: science, applications, commercial, technology development, space operations, national security. Contact was made w/potential users in conducting the study to obtain valid definitions of proposed SS missions. With the exception of DOD mission reqs, this report addresses the accomplishment of the above objective: the methodology used to identify, collect, & analyze mission data; a description of the user mission data; derivation of a baseline time-phased mission set; and the integrated reqs to be satisfied by the SS system elements.</p>	6DC-ASP-83-002
	<p>This document is the second of four books comprising the technical volume of the final report on A Study of SS Needs, Attributes and Architectural Options. It contains a summary of all study tasks performed in the area of defining SS system attributes and architectural concepts required to accommodate & implement the space missions identified in the years 1990 thru 2000 as reported in Book 1 of this volume. The following were the objectives of the Missions Implementation Concepts Task: 1)define recommended SS sys architectural & evolutionary concept & program options; 2)define space sys, sys elements, & subsys requirements; 3)define architectural & evolutionary concepts for major space sys elements & subsys; 4)define major space sys element operations concepts & the role of man in accomplishing them; 5)define space sys & subsys technology needs; and, 6)define space sys programmatic options & identifying evolving business opportunities.</p>	6DC-ASP-83-003
	<p>This document is volume 3 of Study of SS Needs, Attributes, & Architectural Options and it documents Task 3.3 of the study. Section 2 provides an in-depth analysis of the economic value of the SS. The OTV is considered an important part of the sys which makes the sys economically attractive. Materials processing in space is also seen as an important economic benefit. Section 3 of this document provides estimates of SS development & production costs & also of the costs of the candidate missions that have been identified during this study. Section 4 discusses the basic criteria used in the evaluation of the economic benefits of a SS program. Emphasis is given to private industry investment considerations & their relevance to the SS. As a supplement to this study, Gen Dyn provided Appendix I which is a SS Prospectus to show how an alternative SS program, based on private-sector initiative, might be established.</p>	6DC-ASP-83-004
83/04/25	<p>This document appears to be briefing material for a meeting re a study under contract #NAS8-35039. The study produced the necessary technical & planning information to begin the developmental work leading to a space-based OTV capability. It will emphasize the testbed role of the early SS. In addition, the study identifies significant operations-based influences that will guide the configurations of both the SS and space-based OTV. Servicing requirements, including propellants, repair, and maintenance, are mentioned. There are 3 major study tasks: 1)Mission req- evolutionary technology development; 2)Mission definition; and, 3)programmatic development. Conclusions and recommendations are also included.</p>	6DC8-35039-FR
	<p>This document appears to be material for a final review briefing by Boeing officials on a study conducted with the following objectives: define the testbed role of a manned Station in Large Space Structures (LSS) technology development and design conceptually LSS technology development missions to be</p>	BOEIN68-35043-FR

83/04/25 conducted at the Station. Emphasis was placed on defining requirements and benefits of development testing on the Space Station in concert with ground and Shuttle flight technology development tests.

This document contains the presentation material prepared by TRW under NASB-35081 & represents the final results of the study on defining satellite servicing technology. The study proceeded on the assumption of a simple evolutionary SS designed to accommodate early flight experiments. The following are the three major tasks dealt with in the study: mission requirements; mission definition; and, programmatic analysis. The technology development mission is discussed. Study groundrules & highlights, as well as an EVA history are given. Technology development items are listed. The following are the key issues re satellite servicing: safety, project cost, space systems designed for servicing, SS evolution, technology readiness, operations costs, & user acceptance. The conclusions of the study were: on-orbit satellite servicing is technically feasible; on-orbit servicing will support a wide range of NASA, DOD, & commercial missions; SS must play a role; and, development of new technology is necessary.

TRW-DTDM-FR

This document is the final review of the study which produced the necessary technical & planning information to begin the developmental work leading to a space-based OTV capability. It will emphasize the testbed role of the early SS. It will identify significant operations-based influences that will guide the configurations of both the SS & the space-based OTV. The study will identify servicing requirements, including propellants, repair, and maintenance, in a manner that will permit their accomplishment as a part of a single total-service installation. The 3 major study tasks were: mission requirements; mission definition; and programmatic analysis.

BDCDB-35039-FR

83/05/01 The purpose of this document is to define the minimum requirements for the proper design, material selection, fabrication, and testing of safe LO2 and high pressure gaseous oxygen components and systems to provide a control specification for incorporation in NASA manned space flight hardware procurements. The document is directed toward the design of safe LO2 and high pressure oxygen components for flight and prototype flight systems intended for use in manned tests and manned space flight systems. Approved design solutions are also discussed.

J8400089

This document describes the baselined Orbiter EVA provisions and carry-on equipment and the numerous factors associated with their use in sufficient detail to give the user an understanding of their capabilities & limitations. It also provides guidelines and techniques for implementing the design requirements in a manner most likely to result in simple, safe EVA tasks with high probability of success. Section 6 outlines the user & STS responsibilities in P/L integration process as they relate to EVA & describes how NASA standard & optional services can be used in a planned interaction to fulfill the req for safety, flight planning, procedures development, & crew training. Finally, some baselined EVAs are presented to illustrate applications of the guidelines in the document. A history of EVA activity from the Gemini program forward is also given.

JSC-10615

This document is to provide an in-depth background for the operational principles discussed in Book 6 and is to provide the results of tests which conducted operational methodology trades and to document in specific areas operational philosophy applicable to the concepted manned SS system. When

KSC-SSPDD-6A

DATE	ABSTRACT	ID NO.
83/05/01	completed these studies will constitute an agency-wide body of operational knowledge applicable to a permanently manned SS. The document contains the study plans for the Operations Studies. The following topics are covered: study leads & contributions; study task plans; maintainability; automation; operations philosophy; customer interfaces; safety; and prelaunch processing.	MSFC-SS-069
83/05/02	This document provides a synopsis of SS CDG activities. Accomplishments of the CDG and SS Task Force study topics are also given including the names of the individuals available for contact concerning the topic. Autonomy/automation philosophy, maintainability philosophy, logistics philosophy, user operations, and, verification philosophy are examined. Also covered are: servicing facilities at the SS; common element objectives; CDG-proposed common 2-segment module; assembly & berthing module; HM; RM; and, configuration criteria. Study results and conclusions are also given. The document contains no formal, written text but instead utilizes lists, charts, and diagrams to relay information.	MSFC-SS-069
83/05/13	This document can be referenced also as document #DDO-D-1000B. This document is a guide provided to aid the procuring activity in the selection of the appropriate level(s) of engineering drawings and associated lists to be acquired in support of a procurement and in the further cost effective applications and tailoring of this specification. The application of the specialization for a particular procurement involves a number of people of specialized skills at various organizational levels.	JB400014
83/05/16	This document corresponds with document #JSC-07700 Revision H. It provides information on the Space Shuttle system required by P/Ls in the design definition phase. Its purpose is to provide potential users of the Space Shuttle System with an official source of information on the Space Shuttle capabilities to deliver P/Ls into orbit & to return them to earth, on the services that the Shuttle provides to P/Ls, and on the means by which P/Ls can avail themselves of these services. It also defines a set of standard interface provisions b/w SSO & P/Ls. It includes performance data & information on subsys, environments, and support equipment. The document will be revised and updated periodically.	JB400005
83/05/31	This document reports on a Space Station study with the objectives of defining the testbed role of an early (1990-95) manned Station in large space structures (LSS) technology development and designing LSS technology missions to be conducted at the Station. Emphasis was placed on defining requirements and benefits of development testing on a Station in concert with ground and Shuttle tests. Technology development mission requirements (evolutionary technology plan, and mission objectives) are covered. Definition of technology development missions (including mission conceptual designs, mission operations analyses, and accommodation needs from an early Station) are covered. Also programmatic analysis is given (including plans and schedules and mission cost analyses). A conclusion and recommendations are also provided.	D180-27677-1
83/06/14	This document is a collection of lists, charts, and diagrams which examine the following topics: SS Controllability issues; configuration/orientation options & ratings; SS orientations; resource module weights; preliminary allocation of SS capabilities; mass properties calculations; configuration analysis; and, initial SS control needs. It includes diagrams of CDG concept proposed 2-segment SS modules.	MSFC-5627-83

DATE	ABSTRACT	ID NO.
83/06/15	This document is a collection of issues and questions concerning the multiple berthing adapter. Issues and questions are raised concerning the following topics: basic module; safe haven; EVA; airlock; ECLSS; TMS; RMS; attached P/Ls; SS console; habitat module; resource module; orbit maintenance / attitude control; communications & data; logistics module; science accommodations; TMS; servicing; structural/mechanical/mechanisms; contamination; DOD; gravity; ET; autonomy; energy storage; SP's; growth; and, miscellaneous. The document contains no formal written text but presents issues and questions under topical headings.	MSFC-MBA-IA2-6/83
83/06/24	This document has been prepared by NASA to provide a set of scenarios that bound the options available to fulfill the nation's civil space goals for the time period 1991-2000. The study was conducted w/in the framework of exploiting the capabilities of a long-term on-orbit facility w/the added capability of manned interaction. Section 3 develops an evaluation of each scenario to determine if the scenario accommodates the mission set and provides the cost for added capability. Scenarios included are: 1) STS with PEP; 2) STS w/PEP, TMS, OTV, & free-flyers; and 3) STS w/free-flyers, TMS, OTV, & expendable upper stages. A conclusion of the study was that the SS program could provide a unique capability for technology advancement due to the development of technology for the initial & evolutionary stations as well as the technology resulting from the use of the SS as a space oriented technology development lab. Appendices include mission model & list of capabilities of supporting elements.	NASA-ED
83/07/01	This document appears to be material prepared to accompany a meeting of the SS CDG. This group was to engage in a study with the following objective: to lead agency wide sys engineering & integration effort to develop SS concept/architecture/requirements/cost estimate. The following are topics covered in the document: synopsis of SS CDG activities; autonomy/automation philosophy; user accommodation data sys; maintainability philosophy; program cost estimate; logistics philosophy; user operations; resupply; activation; verification; servicing facilities at SS; OMV/OTV/satellite servicing; TMS status; SS configuration; SS geometries; module connection pattern; cost analysis; and, study results. The document contains no formal written text but instead utilizes graphs, lists, & diagrams to relay information.	MSFC-CDG-7/83-2
	This document is the third of a series presenting a strawman avionics sys definition for a SS. The others in the series are JSC-18548 & JSC-18740. This document presents the functional SS avionics sys strawman following additional working group activity that further defined the subsys interfaces & individual subsys processing reqs. The thrust of the latter activity was an attempt at quantifying data bus traffic reqs, as development of a better understanding of subsys interactions. This report contains the results of the Input/Output Working Group and includes background & history, assumptions, methodology, discussions of pertinent technologies, results, issues, and recommendations & conclusions.	JSC-19099
83/07/26	This document appears to be material designed to accompany a CDG meeting. The objective of the group's study is as follows: to lead agency wide sys engineering & integration effort to develop SS concept/architecture/requirements/cost estimate. The following are areas discussed in the document: SS CDG activities synopsis; SS geometries; cost estimate; autonomy/automation/robotics; functional req; autonomy/automation philosophy; user accommodation data sys; maintainability; logistics; resupply; user operations; activation;	MSFC-CDG-7/83-1

DATE	ABSTRACT	ID NO.
83/07/26	verification; DMV/OTV/satellite servicing; SS servicing facilities; common element objectives; proposed 2-segment module; living quarters; operations module; logistics module; assembly & berthing module; common element conclusions; configurations; and, conclusions. This document contains no formal written text but utilizes lists, charts, and diagrams in relaying information.	
83/08/01	This document gives detailed reports for the Operations Studies in the form of Second Level White Papers prepared by the individual study leads of the Operations Working Group. It shows the opinions of the author & not modified to reflect a consensus of the Working Group. The following six topics are discussed: Maintainability; Automation; Operations Philosophy; Customer interfaces; Safety; and, Prelaunch Processing. Subtopics examined include the following: IVA; EVA; software; onboard planning aids; onboard vs ground allocation of functions; problem tracking and solution; simplification of physical, functional, and programmatic interfaces; training for customers; mission planning; safe haven options and approaches; prelaunch logistics; and, BSE considerations.	KSC-SSPDD-62
83/08/10	This document is to provide a plan for the control of microbial contamination which is applicable to Shuttle missions. This document provides specific guidelines & procedures for the monitoring and evaluation of crewmembers, food & the food preparation area, potable water, waste management system, air, & certain sites of the spacecraft interior. The monitoring and preventive measures outlined in this document are applicable to the preceding as well.	J8400034
83/09/01	This document contains a standard which establishes general human engineering design criteria for military systems, subsystems, equipment, and facilities. The purpose of the standard is to present human engineering design criteria, principles, and practices to achieve mission success through integration of the human into the system, subsystem, equipment, and facility, and achieve effectiveness, simplicity, efficiency, reliability, and safety of system operation, training and maintenance. This document may be referenced with document #MIL-STD-1427C, dated 5/2/81.	J8400032
83/10/01	The purpose of this document is to provide a summary of the MRWG activities in the definition of mission reqs. This document was to be released and distributed monthly to the SS Task Force & the user community. The scope of this document is limited to the definition of candidate missions and mission requirements and the analysis & integration necessary to validate this definition. The MRWG has three discipline panels (S&A, Commercial Utilization, and Technology Development) which have the responsibility of interfacing w/their respective user communities in order to analyze & assemble potential missions which could be supported by a SS sys. The Mission Set and reqs described in this report are realistic in terms of NASA program planning, scientific need and Technology availability & need. Detail of these missions and the results of the MRWG are published periodically.	KSC-SS-MRR-10/83
	This document is a report which discusses momentum management for the Planar Space Platform. The external torques on the Station are assumed to be gravity gradient and aerodynamic with both having bias and cyclic terms. The integrals of the cyclic torques are the cyclic momenta which will be stored in the momentum storage actuator. Various techniques to counteract the bias torques and center the cyclic momentum were investigated including gravity gradient	BENDIXB-35349-PR-1

83/10/01 desaturation by adjusting vehicle attitude, aerodynamic desaturation using solar panels and radiators and the deployment of flat plates at the end of long booms generating aerodynamic torques.

This document is an MDD and its objectives are: 1) to identify & describe mission opportunities that would be available to the broad user community with a SS sys; and, 2) to define the time-phased requirements of these mission on SS concepts. The following topics are covered in the document: 1) mission reqs approach & data base; 2) user mission description/summary reqs (SS & applications, commercial, and technology development missions); 3) a summary of user mission requirements (unconstrained); 4) SSS Operational capabilities; 5) time-phased mission set; and, 6) potential SS benefits. A list of names of the members of the MRWG is given.

MSFC-SSPDD-11-E2-2

This document is appendix C of the SS Program Description Document series and contains summary reports of the six major Operations Study groupings of the SS Operations Working Group. The First Level White Papers prepared by the group leads are included in this document. The topics are discussion include the following: Maintainability; Automation; Operations Philosophy, Customer Interfaces; Safety; and, Prelaunch Processing.

KSC-SSPDD-6C

83/10/12 The study which this document reports upon has the following objectives: 1) identify, synthesize, & evaluate the module interface requirements of reference SS configurations and utilize approaches developed in the initial study to establish common groups of interface functions that could be accommodated by a standardized interface design, and 2) further quantify these requirements to develop specific interface design drivers such that the feasibility of standard interface design could be assessed. These objectives were accomplished through a systematic approach of identification of interface functional req, quantifying these req into design req such as coolant line sizes, electrical connector specifications, etc. and developing these req into a conceptual standardized SS module interface design.

SRS/SE-TR64-006

83/11/01 This document is briefing material for an interim review under Contract #NAS8-35042. The objectives of the study reported upon are: 1) define the testbed role of an early (1990) SS which results in a full satellite servicing capability by the late 1990s; 2) define in detail five priority satellite servicing TDMs; 3) evaluate the satellite servicing TDMs for SS architectural & operational requirements; 4) assess satellite servicing potential on an early SS. TDM selection process and TDM detailed definition are discussed. This document contains no formal, written text but instead uses charts, lists, and diagrams to relay information.

MCR-83-1864

This document was prepared as briefing material for an interim review concerning TDMs for an early SS. The study objectives were as follows: 1) to define the testbed role of an early (1990) SS which results in a full satellite servicing capability by the late 1990s; 2) to define in detail five priority satellite servicing TDMs; 3) to evaluate the satellite servicing TDMs for SS architectural & operational requirements and identify OMV interfaces/operations concepts & STS flight experiments; and, 4) to assess satellite servicing potential on an early SS. Included also: Satellite Servicing Study Schedule; TDM definition; TDM Selection Criteria; TDM Candidates; selected TDMs; related pre-mission tasks (OMV, RMS, MPP); post-mission tasks; AXAF Retrieve/Repair Mission; Assembly/modification of SS. Conclusions: satellite servicing TDMs demonstrate a

MCR-83-1864

DATE	ABSTRACT	ID NO.
83/11/01	complete operational servicing ability; TDMs identify servicing accommodation req for SS architecture; & TDM definitions to be basis of satellite ser design.	
83/11/30	The document describes the work required by the SS program. The definition work is separated into two major level C work packages. The first centers on the living & working habitats; and, the second is focused on the utility & spacecraft servicing resources for the manned core & the platforms. System level tasks and specific element tasks (as they relate to habitability or utility work packages) are also covered. This document is closely related to the systems requirements document.	MSFC-SSP-WP-11/83
	This document contains a memo and enclosures concerning SS subsection tasks. Drafts of element subsection reviews comprise the enclosures. Those receiving the memo were asked to make comments concerning the contents. The following subsections were discussed: structures, mechanisms, electrical power, thermal, ECLS, information & data, communications, propulsion, crew systems, EVA & TVA, health maintenance, fluid management, modular growth/commonality, autonomy, automation/autonomy, human productivity, maintainability/restorability, reliability, quality assurance, safety, and, configuration/controllability.	NASA-WPST-11/83
83/12/01	The purpose of this document is to describe the planning & implementation activities associated with developing technology for the SS. The emphasis of this document will be the SS Advanced Development Program & it is organized to describe the elements thereof, the management approach & organizational relationships, technology by theme & technical discipline, test beds, & flight experiments. Detailed discipline activity plans which integrate across focused technology, prototype technology, test beds, and flight experiments, will augment this document in the form of appendices.	MSFC-SSPDD-12-83-4
	The purpose of this document is to summarize the results of a brief special emphasis SS configuration study conducted at JSC from 11/2-12/16 1983. The objectives of the study were as follows: define candidate SS configuration concepts to meet CDG req; produce engineering & programmatic data on these concepts; and, produce a data base for input to the CDG's evaluation of generic SS configurations. Section 3 of this summary report provides an overview description of each configuration concept. Section 4 presents functional description & evaluation of each configuration in terms of user, crew, operation, and safety accommodations. Engineering & cost evaluations are also provided in section 4. Section 5 summarizes the results of the cost analysis & delineates the technical and programmatic issues identified for future study.	JSC-19521
	The purpose of this report is to document the results of a brief special emphasis Space Station Configuration Study conducted at JSC from 11/2 - 12/16 1983. The objectives were as follows: define candidate SS configuration concepts to meet NASA/HQ CDG req; produce engineering & programmatic data on these concepts suitable for NASA & industry dissemination; and, produce a data base for input to the CDG's evaluation of generic SS configurations. The organization of this report is arranged to present the definition & evaluation of each of the candidate concepts on an individual stand-alone basis. Section 2 provides an overview description of configuration concept. Section 3 presents functional description of configuration in terms of user, crew, operation, & safety accommodations and Engineering & cost evaluations.	JSC-19521

83/12/01 The purpose of this report(vol 2)is to document the results of a brief special emphasis Space Station Configuration Study conducted at JSC from 11/2 - 12/16 1983. The objectives were as follows: define candidate SS configuration concepts to meet NASA/HQ CDG req; produce engineering & programmatic data on these concepts suitable for NASA & industry dissemination; and, produce a data base for input to the CDG's evaluation of generic SS configurations. The organization of this report is arranged to present the definition & evaluation of each of the candidate concepts on an individual stand-alone basis. Section 4 in volume 2 provides more detailed discussion of subsystem definition and Section 5 delineates the technical and programmatic issues identified for future study. Section 6 provides a listing of the personnel involved in this study.

JSC-19521

This document chronicles the study effort which defined the TDMs for the early SS. Specifically, this effort is for the definition of TDMs related to OTV servicing & will be concurrent w/other studies to define TDMs related to satellite servicing & LSSs. The objectives of the study were: define the testbed role of an early (1990) manned SS in context of OTV evolutionary development; refine the definition of selected priority OTV TDMs to be performed at SS; identify OTV servicing operations which can be performed by an initial SS; and, perform an operations analysis to identify the functions that a SS must perform to totally support an operational spacebased OTV fleet.

6DC-SP-83-067

This document contains habitability requirements applicable to the SS. The following areas are examined: 1) internal environment; 2) habitability architecture; 3) mobility and restraint; 4) food systems; 5) health maintenance; 6) clothing; 7) personal hygiene; 8) housekeeping; 9) communications; 10) crew activity; and, 11) crew structures.

JB400037

This document defines the operational approach for the SS System. Emphasis is placed on new operational factors that arise with the permanently manned orbital facility, means to operate the System in the safest and most cost-effective manner, and a customer-oriented, "user friendly," operational approach to achieve maximum benefits from the System. This document is intended to be a reference document from which operational requirements have been derived for the SS program. The ground rules & scenarios are given in Sections 2 through 9 and the derived operational req are given in Section 10. Operations concept, orbital operations, P/L & mission operations, ground control/support operations, pre-launch ground operations, training, ground-based facilities, and operational studies are all given attention. It includes 5 appendices dealing w/ operations study plan, 1st & 2nd Level White Papers, operational req traceability matrix, & acronyms, the first four of which are published separately.

KSC-SSPDD-6

This document defines the operational approach for the SS. Emphasis is placed on new operational factors that arise with the permanently manned orbital facility, means to operate the SSS in the safest & most cost-effective manner, and a customer-oriented, user-friendly, operational approach to achieve maximum benefits from the SSS. This document is intended to be a reference document from which operational requirements have been derived for the SS program. The ground rules and scenarios are given in Sections 2 thru 9 and the derived operational requirements are given in Section 10. Operations Concept, Orbital operations, P/L & mission operations, ground control/support operations, prelaunch ground operations, training, ground-based facilities & facility concepts, operation studies, and a summary of operational req are all given consideration.

MSFC-SSPDD-12-83-6

DATE	ABSTRACT	ID NO.
83/12/01	<p>This document is a SOW describing a 15-month study which is intended to investigate alternative concepts and conduct program level trade studies & assessments which will allow focusing the OTV Program toward future development in areas such as the SS. Objectives of the study are: define preferred OTV concepts; define interaction between the OTV and the SS, and an assessment of the requirements of space-basing on both. Specific objectives are: 1) assess & critique the NASA-provided mission model & develop sys req; 2) define concepts of ground-based OTV which may become space-based; 3) define OTV concept to be initially space-based; 4) assess design req to provide capability of OTVs of obj. 2&3; 5) determine impacts/interfaces of OTV with SS or STS; 6) assess req for hardware elements; 7) develop programmatic data; 8) conduct trade studies; and, 10) identify critical technology requirements.</p> <p>This document is an Appendix D to the other SS Program Description Documents and it supplies a traceability matrix for the operational requirements given in Section X of Book 6, entitled "System Operations Document." The references used are given in the matrix and on the first page, D-1. Only those documents directly linked to the SS Program or similar programs (Skylab) were used as reference documents.</p> <p>This document is an appendix which includes a traceability matrix for the operational req given in Section X of Book 6, "System Operations Document." The references used for traceability are given in the matrix and on the first page, D-1. Only those documents directly linked to the SS Program or similar programs, such as Skylab, were used as reference documents.</p> <p>This document is assigned the task of defining the scope of SS support of operational OTV servicing. The objectives of the study given this task were as follow: 1) define the testbed role of an early (1990) SS in the context of a space-based OTV evolutionary development & flight demonstration technology plan that results in an OTV servicing operational capability by the mid 1990s; 2) refine the definition of selected priority OTV servicing technology development missions to be performed on an early SS; 3) generate an integrated OTV servicing technology development plan that includes ground, Shuttle sortie, & SS activities; 4) identify OTV servicing operations which can be performed by an initial SS; and, 5) perform an operations analysis to identify the functions that a SS must perform to support totally an operationa space-based OTV fleet.</p> <p>This document was prepared by the SS Operations Working Group and summarizes the operations requirements applicable only to the SS System in regard to the following operational categories: overall operations; safety; medical; customer operations; automation; maintainability/maintenance for hardware & software; habitability; operational security; and, operational quality assurance.</p>	<p>JSC00066</p> <p>MSFC-SSPDD-12-83-41</p> <p>KSC-SSPDD-60</p> <p>6DC-SP-83-067</p> <p>KSC-SSPDD-6R</p>
84/01/01	<p>The purpose of this document is to establish the functional req for a representative large orbiting SP to be used as the BL for the SP's thermal management sys trade analyses & design. It provides the basic specifications for the High Efficiency Automated Thermal Control System study. The document also provides the basic source for deriving the specifications for the representative thermal management sys (TMS) h/w specifications & subsys specifications. The following are covered: reference SP req, thermal management sys req, safety req, maintainability req, and reliability req.</p>	SSDB4-0002

DATE	ABSTRACT	ID NO.
84/01/01	This document establishes the mission & system requirements for the Orbital Maneuvering Vehicle and associated ASE, GSE, and Ground Control Station. The requirements specified are broad category, top level requirements that will be expanded & detailed during the definition phase of the program. Pieces of equipment also being given attention are: strap on/ belt on propulsion units, docking/manipulator mechanisms, servicing kits, tanker modules, and refueling kits. Specific req include: design & performance req, physical characteristics, reliability, maintainability, safety, design & construction standards, system verification, logistics, quality, stuttle integration, data procurement, and gov't-furnished property.	J8400065
84/01/03	This document is a MSFC press release informing the media of MSFC's RFP inviting aerospace companies to describe how they would define the concept of an OMV for moving satellites & other orbiting objects hundreds of miles above the Earth. The companies had until 2/14/84 to respond to the request, after which time, MSFC would select at least 3 companies for contracts ranging from \$1.7-1.9 million over a 12-month period. The OMV is to supplement the STS due to the Shuttle's limitations in maneuvering to higher altitudes. As envisioned, the OMV would be 15 ft in diameter & 3 ft in length. The OMV would be deployed from the Shuttle in the early years for short duration missions; later it would remain in orbit for extended periods of time. Its most essential attribute is that it would be capable of supporting the future SS. The OMV would be operationally available for assembly & buildup on an initial SS in the early 1990s and would be an essential element of the SS.	MSFC Release 84-1
84/01/25	The purpose of this document is to describe the overall technical, management, & procurement approach for the SSP. The plan is structured so that it briefly describes the program & summarizes the activities entailed in implementing the SSP. It also details the technical plan, management plan, procurement strategy, schedules, and resources required to implement the SSP. This document broadly describes the total SSP from the definition & establishment of the mission req through the initial operations in orbit. The primary emphasis is on the definition & preliminary design phase & the planning & definition of issues associated with progressing into the program development phase. The following are covered in the document: SSP content; SSP goals & objectives; management approach; technical approach; procurement approach. This document is a pamphlet produced by NASA and printed by the US Government Printing Office. The document provides drawings of different SS configurations as designed by different organizations (MDAC, TRW, Rockwell, Boeing, LMSC, and NASA installations). Brief introductory material and captions are provided along with the drawings. Space Station plans and concepts are discussed. The modular approach, cost estimates & timetables, international cooperation, and commercialization are discussed. Brief justification is given for having a SS and for its being manned.	MSFC-SSPDD-1-84-7
84/02/01	This document is a report which traces the evolution of the ideas of tether applications in space from its origins in the last century past a dormant period of 65 years to the the mid 1970s. At that time, as a consequence of major revival efforts, NASA entered into serious investigations of the theoretical & practical feasibility of a large number of tethered concepts in space. These efforts culminated in the establishment of the Tethered Satellite System Project now at NASA in the advanced development phase. The report describes NASA's 1983 extensive planning efforts, first, through a Tether Applications in Space	EP-211
		NASA-TM-82571

84/02/01 Workshop which generated additional concepts & provided overall assessments & recommendations to NASA, and then through a NASA inter-center Tether Application in Space Task Group which generated a four-year program plan in the areas of further studies, technology, work & science & applications of tethers in space. The report offers an outlook into the future of tether applications.

This Executive Summary is volume 1 of the final report on the Space Station Systems Technology Study. The overall study objective was to identify, quantify, and justify the advancement of high-leverage technologies for application to both the early and more advanced Station. Four study areas were addressed in the study: 1) attitude control; 2) data management; 3) long-life thermal management; and 4) automated housekeeping integration.

D180-27935-1

This is vol. II of final report on the Station Systems Technology Study. This volume presents results of the technical effort. Four areas covered in the study were: 1) attitude control; 2) data management; 3) long-life TM; and 4) automated housekeeping integration. These studies were conducted to facilitate a more in-depth analysis of technology issues. Each of the study areas had a high leverage technology identification as a goal and different study approaches were required. The attitude control study utilized a specific representative configuration and determined by simulation the applicability of a low bandwidth control system for Station use. The data management study concentrated on the characterization of the architecture into structural blocks and system to facilitate simulation planning. The thermal study focused on characterizing two-phase heat transport system within long-life requirement constraints. Automated housekeeping is also discussed.

D180-27935-2

This is volume III of a 3-volume final report of the Space Station Systems Technology Study. The Technology Advancement Program Plan was initiated with the results of the Advanced Platform System Technology Study and 2 other studies. Descriptions for development of each viable technology advancement were drawn from the trade studies. A logic flow diagram depicting the steps in developing each technology item was developed along with descriptions of major element of the flow. Major elements were time-phased, allowing the definition of a development schedule consistent with the SSP when possible. Advanced program plans were developed for the following areas: Data Management System, Long-life Thermal Management System, and Integration of Automated Housekeeping. Each plan contains information on technical approach, facility requirements & candidate facilities, development schedules, and resource req estimates. The plans were scheduled to support a Station. Planning is based on early 1984 start-up.

D180-27935-3

84/02/29 This document is a news release announcing that NASA has established 7 inter-center teams to conduct advanced development activities for high potential technologies to be used in SS design & development. These assignments are to identify emerging technologies for AD for SS design & to establish test beds into which prototype technology h/w could be integrated, tested, demonstrated, & evaluated. 3 of the inter-center teams are to be led by MSFC & 3 by JSC; the other will be assigned later. Center Assignments: Attitude Control/Stabilization, MSFC is lead center of the team which includes JPL, JSC, & LaRC; DMS, JSC is the lead of team including GSFC, KSC, ARC, JPL, LaRC, Nat'l Space Technology Lab; Auxiliary Propulsion Sys, MSFC is lead of team including LeRC, JPL, & JSC. ECLSS, JSC is lead of team which includes ARC; Space Operations Mechanisms, MSFC is lead with team of JPL, JSC, LeRC, & LaRC; TMS, JSC is lead with GSFC, JSC, LeRC, & MSFC on team; EPS, with inter-center team of JSC, LeRC, MSFC, & JPL.

MSFC Release 84-11

84/03/01 The purpose of this report is to document the preliminary results & specifications for Steerable Radiators systems applicable to large SPs. The following were considered: sys design req (mission req & thermal management sys req) & Steerable Radiator specifications (life, radiator design, pressure containment, fluid-material compatibility, coating degradation & contamination req, contamination, structural integrity, weight & volume, tracking sensors, drive mechanism controls, drive mechanism, rotational axis selections, rotational rate req, steering accuracy, and fluid heat transfer joint). Also included is a Steerable Radiator Requirements Analysis and Results report in the Appendix.

SSD84-0041

This document is Book 4 of a 6 volume set in the SSPDD series. It deals specifically with ADP. The purpose of this document is to describe the planning & implementation activities associated with developing technology for the SS. This document is organized to describe the elements of the ADP, the management approach & organizational relationships, technology by theme & technical discipline, test beds, & flight experiments. Detailed discipline activity plans which integrate across focused technology, prototype technology, test beds, & flight experiments, augment this document in the form of appendices. Focused technology disciplines include the following: data management, ECLSS, power, thermal, human productivity, auxiliary propulsion, attitude control & stabilization, structures & mechanisms, & communications. The types of test beds covered are: DMS, ECLSS, power sys, thermal sys, ACS, auxiliary, propulsion, & space operations. See also NASA-TM-86652.

JB400120

This document is Book 6 of a six volume set known as the SSPDD. Book 6 focuses on System Operations. This document defines the operational approach for the SSS. Emphasis is placed on new operational factors that arise with the permanently manned orbital facility, means to operate the SS in the safest & most cost-effective manner, and a customer-oriented, "user-friendly," operational approach to achieve maximum benefits from the sys. This document is intended to be a reference document from which operational req have been derived for the SSP. The ground rules & scenarios are given in Sections 2 thru 9 and the derived operational req are given in Section 10. The SSS operations examined include: orbital ops, P/L & mission ops, ground control/support ops, & prelaunch ground operations. Training, ground-based facilities & facility concepts, and operations studies are also examined. Appendices include Operations Study Plan, 1st & 2nd level white papers. Also see NASA-TM-86652.

JB400121

This document is one of a set of six volumes: 1- intro; 2- mission description; 3- sys reqs & characteristics; 4- advanced development; 6- sys operations; and, 7- program plan. These documents are a product of SSTF & known as the Yellow Books, which define the SSTF recommendations in the areas of mission reqs, sys reqs, & program planning. This first volume of the set is an introduction and summary of the entire study covering the other five documents. There is not a volume 5. See also NASA-TM-86652. These volumes comprise what is known collectively as the Yellow Books.

JB400117

This document is one of six volumes in the SSPDD. This Mission Description Document takes as its objectives: 1) to identify & describe the mission opportunities that would be available to the broad user community with a SSS; and, 2) to define the time-phased req of these missions of the SS concepts. The following topics are covered: Mission req approach & data base; user mission description/summary req (SS & applications, commercial, technology development

JB400118

DATE	ABSTRACT	ID NO.
84/03/01	missions); summary of user mission req; SS sys operational capabilities; time-phased mission set; and, potential SS benefits. Subtopics include: astrophysics, earth sciences & applications, solar system, life sciences, materials processing, earth & ocean observation, commercial communications satellite, industrial services, structures, energy conversion, computer science & electronics, propulsion, controls & human factors. See also NASA-TM-86652. This document is known as one of the Yellow Books.	
	This document is volume 3 of a 6 volume set of the SSPDD. This volume deals with sys reqs & characteristics. It defines a set of technical reqs for a manned earth orbiting SS & supporting ground systems as compiled by the CD6. It will serve as a reference document for establishing the top-level program reqs & for use in the definition & preliminary design phases of the SSP. This includes the definition of characteristics & requirements for the overall sys, subsys, flight & ground operations, performance, & system verification/acceptance. The following are topics for discussion herein: sys definition; customer accommodations; operations & logistics reqs; sys reqs; subsys reqs (structures, mechanisms, electrical power, thermal control, info & data management, C&T, GN&C, propulsion, crew sys & support, IVA, EVA, health maintenance, & fluid management); interface req (STS, TMS, OTV, SP, free-flyers, attached P/Ls, SS modules, TDRSS, ground support; & sys verification reqs. See NASA-TM-86652.	J8400119
84/04/01	This document is a Fracture Control Plan by which "fracture critical parts" (parts whose failure would result in loss of life or loss of a major space element, (STS or SS)). This plan delineates the methodology & techniques which will be used to assure that structural failures will not occur due to the presence of undetected crack-like flaws. The criteria set forth in this document are intended to cover a variety of fracture critical applications and are to be implemented as appropriate for a given part or subsystem. A list of terms and their definitions are provided.	J8400020
	This document is a Fracture Control Plan which delineates the methodology & techniques which will be used to assure that structural failures will not occur due to the presence of undetected crack-like flaws. The criteria set forth in this document are intended to cover a variety of fracture critical applications and are to be implemented as appropriate for a given part of subsystem. The objective of this plan is establishment of responsibilities, criteria, & controls necessary to prevent structural failures due to the effects of defects & flaws assumed to be present in all fabricated structures. The plan is applicable to all "fracture critical" parts for SS structure & any associated h/w as defined in this document. This plan is applicable to NASA in-house SS activities and all related contractor activities & subcontractor efforts. The document supplies requirements & documentation. 2 appendices: I- Criteria & Guidelines for Fracture Mechanics & II- Flaw Sizes for Nondestructive Eval.	JSC-19649
	This TM describes the repetitive use of operational modules, which minimizes on-orbit stay time for the Shuttle; this is done as a part of the identification of an effective SS construction concept. The point made in the document is that a SS constructed of operational modules may benefit from fabrication & sys checkout in ground-based facilities, & since the modules are the primary structure of the SS, a minimum of additional structures, trips, and on-orbit stay time of the Shuttle are required.	NASA TM-85772
84/04/05	This document describes the overall technical, management, and	J8400058

- 84/04/05 procurement approaches for the SS program. The plan is structured so that it briefly describes the Program and summarizes the activities entailed in implementing the SSP. It also describes the technical & management plans, procurement strategy, schedules, and resources required to implement the SSP. Primary emphasis is placed on definition & preliminary design phase and the planning and definition of issues associated with progressing into the SSP development phase. As the Program matures, this document will be revised to provide greater detail on program development & follow-on phases of the SSP. See also NASA-TM-86652. This document is one of the Yellow Books.
- 84/04/09 This document is a MSFC News Release which announces the selection of the Manager and Deputy Manager for the Space Station Program Office at JSC. Neil B. Hutchinson was named Manager and John W. Aaron was named Deputy Manager. The document goes on to give a brief biography of each man. MSFC Release 84-26
- 84/05/01 The purpose of this report is to document the preliminary results and specifications for a Cabin Area Thermal Bus applicable to large SPs. The following are covered in the document: sys design req; pressurized cabin thermal bus general specifications; metabolic loop design specifications; pumped liquid water internal equipment bus specifications; and, two-phase internal equipment bus specifications. SSD84-0075
- The purpose of this report is to document the results of a Thermal Management (TM) System Concepts trade study. In this study, the feasibility, practicality and performance of selected concept TM sys for large SPs were evaluated & candidate TM sys were identified and selected for further detailed study and performance analysis to be performed. The following are examined in the document: TMS design req; sys evaluation criteria; trade variables; TMS sys concept evaluation approach; alternate fluids & radiator concepts; decentralized pumped liquid loop sys; decentralized two phase transport sys; and, additional trades. SSD84-0059
- This document describes an integrated technology development plan for the technologies required to perform the OTV servicing mission. The plan includes definition of the tests & experiments to be accomplished on the ground & in the SS sortie missions as precursors to the TDM to be performed on the early SS. The objectives of this study were: perform an operations analysis to identify the functions that a SS must perform to support totally an operational space-based OTV; identify OTV servicing operations that can be performed by an initial SS; generate an integrated OTV servicing technology development plan that includes ground, shuttle sortie, and SS activities; refine the definition of selected priority OTV servicing technology development missions to be performed on an early SS; and, define the testbed role of an early manned SS in the context of a space-based OTV. GDC-SP-83-067
- This document describes the capability of the initial SS to support & service an operational ground-based OTV to allow an early operational mission (1990-92 time frame). The capability of a single mission such as payload/OTV mating, checkout, and launch was analyzed, as well as the capability to service the OTV for any maintenance. The number of OTV missions that can be flown from the initial SS along w/incremental additional numbers of missions, ground, & STS technology demonstration missions were identified which required to enable OTV servicing at an initial SS. GDC-SP-83-067

DATE	ABSTRACT	ID NO.
84/05/01	This document describes the study effort which was the second phase undertaken by Gen Dyn for the definition of TDMs for the early SS. Specifically this study encompassed the definition of the requirements for the TDMs related to OTV servicing & was conducted concurrently with other studies that defined TDMs related to satellite servicing & LSSs. The study took 3 major tasks: 1) an operations analysis to identify the functions that a SS must perform to support totally an operational space-based OTV & identified the technologies to be developed to provide this capability; 2) identify OTV servicing operations which can be performed by an initial SS & required technology development; and, 3) generated an integrated OTV servicing technology development plan that includes ground & shuttle sortie activities that are precursors to the TDMs to be performed on the early SS. The TDMs were defined in Phase I of the study and are summarized here in the appropriate areas.	GDC-SP-83-067
84/05/29	This document is to provide reference information that constituted the basis of the EOS study project inputs to the polar platform sections of the SSP, Phase B RFP. This document reflects the extent of the EOS study activity to date. The resource module considered herein is based on the SS CD6 (CD6-1) concept. This document presents a conceptual definition of the elements of the polar platform, system & subsystem performance specifications, and interface req b/w the resource module & the P/L carrier sys. Also included are integration plans, launch considerations, EOS mission evolution, planning, operational considerations, & requirements on interfaces external to the EOS platform. Covered herein also: electrical power, TCS, GN&C, propulsion, structures, mechanisms, and interfaces with STS, DMV, TDRSS, GPS, ground support system, instruments, and processing centers.	J8400074
84/06/15	This document was prepared to serve as a guideline for the work package contractors in the formulation of their Systems Test and Verification Plans. These individual plans will be utilized by NASA in the production of an overall SS Systems Test and Verification Plan. The discussion of both general & unique categories are supplied to aid in achieving a consistency across the work package lines. The test types discussion covers a broad spectrum of possible h/w & s/w and it is not intended to convey that each of the test activities listed are applicable to all of the work package elements. Test types include: Development; Acceptance; Certification; Maintainability Demonstration; Systems Integration; Launch readiness; on-orbit readiness; and, subsystem tests.	J8400082
84/07/01	This document is a bi-monthly report of RI's activities involving the GTA. A contract was made with SanteK Engineering to fabricate & perform checkout testing of the GTA. RI attempted to reaffirm the positioning control sys motion profile & define the necessary profile changes imposed by the new simplified longeron joint design. A milestone chart, planned work, problem areas, and a financial summary are given in the document. The reporting period ran from 5/1/84 through 6/30/84.	RICB-34657 BMR2
	This document is designed to define the initial plans for processing the SS elements through KSC and VAFB. This processing includes the integration, test & checkout, and launch of the initial & follow-on SS elements, as well as the refurbishments, maintenance, reconfiguration, & relaunch of the cyclical elements. This plan provides a brief scenario for processing the SS as defined in attachment C-5 of the RFP. The general SS ground operations philosophy is defined in this plan & key groundrules & assumptions are identified. The plan discusses overall verification req for site activation & flight h/w elements.	J8400068

84/07/01 Necessary documentation is provided. Standard launch-site operations are specified and flows & schedules provided for SS elements. This document describes facility & equipment req & implementation approaches, addresses customer interfaces & safety & security aspects, and concludes with planning for some SS contingencies.

This document is intended to state the very basic requirements to be included in consideration of concept development required by the SSS Phase B Systems Definition Studies. It should be used to guide planners in considering security aspects with the other design parameters in arriving at an acceptable configuration. The document considers the following: System Description (SSS, Ground Operations System, Command Control & Communications, and On-Orbit; and, Security Policy & Requirements (SSS Security Policy, Level A Security Requirements, Ground Operations, On-Orbit Operations, and Command Control & Communications).

JB400073

84/07/02 This document describes the planning & implementation activities associated with developing technology for the SS. The emphasis of the document will be the SS Advanced Development Program which will be funded under the SSP. This document is organized to describe the elements of the Advanced Development Program, the management approach and organizational relationships, technical content by discipline, test beds, and flight experiments. The detailed plans in each discipline will be updated yearly to reflect accomplishments, funding levels, and any changes in emphasis.

JB400059

84/07/09 This document reports on the SS Automation Study which was to develop informed technical guidance to NASA in the use of autonomy & autonomous systems to implement SS functions. GE was assigned the task of assessing automation technology required for remote operations, including manufacturing applications. In accomplishing this task, GE assessed 100+ potential SS missions through an extensive review of proposed SS experiments & manufacturing concepts. In-depth development of automation req for two manufacturing design concepts were also forthcoming. The two concepts were: 1) Gallium Arsenide Electroepitaxial Crystal Production and Wafer Manufacturing Facility and 2) Gallium Arsenide VLSI Microelectronics Chip Processing Facility.

GE5-25182-FR-ES

84/07/11 This document is a MSFC news release which announces the awarding of contracts to companies for studies of the OTV. MMA in Denver & Boeing in Seattle each were awarded \$1 million contracts to run for 15 months. The studies are to examine both space-based & ground-based concepts of the OTV. The space-based version would be maintained & refueled at the SS, whereas a ground-based OTV would be transported to & from space by the shuttle. The OTV concept involves an unmanned upper stage initially; then it would develop into a manned vehicle able to ferry a crew capsule.

MSFC Release 84-57

84/07/18 This document establishes common product assurance requirements with respect to safety, reliability, maintainability, and quality for the SS for government organizations & contractors. SS management of product assurance will include the following: defining the major product assurance with respect to safety, reliability, maintainability, and quality and assuring that they are performed as integral parts of the design, development, test, and operational phases; evaluating safety, reliability, maintainability, and quality of hardware, software, and operations through analyses, tests, reviews, and assessments; Providing timely status reporting and documentation of the product

JB400001

DATE	ABSTRACT	ID NO.
84/07/18	assurances efforts; establishing compatible req among manufacturing, test, launch and ground operations sites.	
84/07/23	This document is a report which gives details concerning a study designed to perform a conceptual definition of the various factors contributing to crew productivity, to identify issues for the development of man-system interfaces in the SS as they relate to human productivity, to analyze these issues in terms of engineering & cost factors, to identify & prioritize trade studies required for open issue resolution, & to recommend man-systems interface design & operational req. Results of the study will support further SS activity. This study should have a Final Report listing the findings of the study. This document specifically lists the tasks to be performed in this study and gives a list of program documentation & review req. Contractor cross-talk coordination activities are also listed.	JB400079
84/07/24	This document is a MSFC news release which announces the selection of the following aerospace companies for negotiations leading to contracts for OMV System Definition Studies: LTV Aerospace & Defense (Dallas), MMA (Denver), and TRW (Redondo Beach, CA). The three contracts will be managed by MSFC and will be 12 months in duration with a combined dollar value of \$5 million. One of these companies, it was speculated, would ultimately receive the contract for building the flight hardware of the approved OMV. The OMV would have the ability to retrieve and reboost satellites from & to higher orbits than are accessible by the STS. As initially conceptualized, the OMV would be deployed from the Shuttle for short-duration missions; later it would remain in orbit for extended periods of time for use in both STS-based missions & SS-based missions. The vehicle is expected to be available for assembly & buildup of an initial SS in the early 1990s.	MSFC Release 84-67
84/07/26	This document evaluates a report, the purpose of which is to evaluate the feasibility of the use of tethers for SS applications. Concepts evaluated are categorized as tethered platforms (fuel storage & refueling, science & research experiments, & communications), electrodynamics (electrical power, reboost thrust), and transportation applications (deployment of STS, OMV, OTV). This study was initiated to evaluate each of benefits which tether applications were seen to have for the SS and to determine the req which those beneficial concepts impose on SS. The impacts analysis includes such items as equipment req, equipment location on SS, dynamics, orientation, crew req, safety, and comparison data.	MMCB-35499-FR
84/07/30	This document promulgates requirements which provide the framework for the development of an overall SSS that is characterized by having an integrated logistics sys throughout the entire evolution of the SSS. These req must be considered in all work packages with respect to SS development. This document is organized to describe the overall management approach, the elements which make up the overall logistics system & detailed req to support the implementation by all organizations participating in the SSP development.	JB400071
84/07/31	This document reports on an analysis of 5 concepts regarding tether applications in space. The concepts were selected, missions defined, groundrules & assumptions established, operations scenario developed, equipment concepts derived, safety provided for, areas of uncertainty identified, and technology development needs were compiled. The 5 concepts were as follows: A) tether effected separation of an Earth-bound Shuttle from SS; B) tether effected orbit	MMCB-35499-FR

84/07/31 boost of a spacecraft (AXAF) into its operational orbit from the Shuttle; C)an operational science/technology platform tether deployed from SS; D)tether mediated rendezvous- an OMV tether deployed from SS to rendezvous with an aerobraked DTV returning from a P/L delivery mission to geosynchronous orbit; and, E)an electrodynamic tether used in a dual motor/generator mode to serve as the primary energy storage facility for SS. Each of these concepts is discussed in a separate section in this document.

84/08/01 This document contains 2 volumes. Volume I discusses the overall intent of the architectural description presented in Volume II. Detailed in II is the conceptual design of a SSIS architecture representing the results of the SSIS study. The sections of the document are arranged in an order which reflects the steps taken in conducting this study. The relationship of each of the sections to the steps in the study is briefly described by sections: 2- user categories, 3- information system services, 4- intro to SSIS diagrams, 5- SSIS functions, 6- service requirements, 7- issues & concerns. 4 appendices are given: A- Reference Model of Space Data Systems, B- Glossary, C- references, D- subject index.

J8400097

This document presents an overview of the SS and a plan for its operation & utilization. It considers support capabilities located on both the SS & ground and describes the functions that these systems & their associated personnel must perform. The intent of this document is to introduce operations considerations into SS design with the goal that the SS can be operated in the most safe and cost-effective manner while also encouraging customer participation. Operations scenarios, operational guidelines for system design, flight planning & support systems description, Station crew functions, and ground support personnel functions are specifically considered in the document.

J8400067

84/08/08 This document presents the standard Work Breakdown Structure that has been developed by the Standardization Subgroup of the joint Government/industry Space Systems Cost Analysis Group. This WBS features a common 4-level structure that applies to all phases of a space system's life cycle. This framework is designed to be tailored in both the end-item & time-phasing dimensions so as to create specific project WBSs that match the program being procured. Part II of this document comprises the WBS dictionary. This dictionary defines & amplifies parts of the WBS. This WBS is end-item oriented; that is, it deals with the dimension of program resources that result in a defineable end product or service. The other dimensions of program cost have not been standardized. Lists of typical space-system subdivisions of work and elements of cost have been appended for a full understanding of the cost build-up in space systems.

J8400036

84/08/10 This document contains baselined operational requirements for the Space Station System. The reqs for the SSS operations are defined in this document for the following operational categories: 1) overall operations; 2) safety; 3) medical; 4) customer operations; 5) automation; 6) maintainability/ maintenance for hardware & software; 7) habitability; 8) operational security; and, 9) operational quality assurance.

J8400062

This document is the user's guide for the Relational Information Management System, BCS RIM Version 6.0. The information presented consists of instructions for using BCS RIM as a standalone system and for using BCS RIM from an application program. Section 1.0 presents implementation & access information for BCS RIM, a discussion of the data base files, & general syntax of the BCS

J8400064

- 84/08/10 RIM language. Section 2.0 presents instructions for the use of RIM as a standalone sys in both menu & command modes & a discussion of all available RIM commands is presented. Section 3.0 presents instructions for the use of the application program interface. Appendices present a summary of the BCS RIM commands, a summary of the application program interface, a sample FORTRAN program using the BCS RIM applications program interface, a list of current limitations, and a discussion of the BCS RIM user interface routines.
- 84/08/20 This document contains information concerning the effects of orbital debris on the SS. Also contained in this document is "Design Standard Environment" which represents the best estimate of a future orbital environment. It is based on available data of the expected environment in the 1990s. J8400021
- 84/08/24 This document is a SOW for a study defining & establishing design req & design criteria, & defining technology & advanced development needs for a SS EVA System. Comprehensive SS mission analyses are to be accomplished in order to determine the potential for productive EVA in fulfilling the goal of this study. EVAs include crew enclosures (space suit), portable LSS, powered maneuvering capability, & ancillary equipment (work stations, restraints, tools, etc). The study will formulate, identify, & define as design criteria related human productivity elements in terms affecting EVA. The study is conducted to compile definitive req relating to the SS EVAs. H/W req to be found after study of EVA environments, operations, procedures and SS/STS interfaces. Satellite servicing activities are framed. It also shall identify, define, & categorize specific elements of human productivity regarding physiological, medical, & physical man/machine specifications relating to EVA. J8400085
- 84/09/01 The purpose of this document is to provide a summary report of the MRWG activities in the definition of mission requirements. This document will be released & distributed periodically to the SS project and the user community. The scope of this document is limited to the definition of candidate missions & mission req and the analysis and integration necessary to validate this definition. Descriptions are provided for 3 divisions of missions: Science & Applications, Commercial Utilization, and Technology Development. MRWG-001
- This document corresponds with Document #TM-86460. It provides the natural environment design criteria requirements for use in the Space Station and its Elements definition and preliminary design studies. It addresses the atmospheric dynamic & thermodynamic environments, meteoroids, radiation, physical constants as is intended to enable all groups involved in the definition and preliminary design studies to proceed with a common and consistent set of natural environment criteria requirements. J8400040
- This document is a progress report of RI's activities involving work with the GTA. The reporting period ran from 7/1/84 through 8/31/84. Planned work, problem areas, and a financial summary are given. Also included with the document is Appendix A SOW for Positioning System for Deployable Platform System. RTCB-34657 BMR
- This document is a review of meteoroid flux measurements & models for low orbital altitudes of the SS which has been made in order to provide information that may be useful in design studies & laboratory hypervelocity impact tests which simulate micrometeoroids in space for design of the main wall of the SS. This report deals with the meteoroid flux mass model, the defocusing NASA-TM-86461

84/09/01 & shielding factors that affect the model, the probability of meteoroid penetration of the main wall of the SS. The equations of the probability of meteoroid penetration, the average annual cumulative total flux, and the equations for the thickness of the main wall and the bumper are presented.

This document provides the natural environment design criteria requirements for use in the SS and its Elements definition & preliminary design studies. It addresses the atmospheric dynamic & thermodynamic environments, meteoroids, radiation, physical constants, et c., and is intended to enable all groups involved in the definition and preliminary design studies to proceed with a common & consistent set of natural environment criteria requirements.

NASA-TM-B6460

This document takes as its purpose to define the requirements for materials & processes & to provide a general control specification for incorporation into NASA SS h/w procurements & technical programs. This document is primarily directed toward materials & processes used in the fabrication & testing of flight components for manned space flight vehicles. The document also covers ground support equipment where operations or compatibility interfaces can adversely affect the performance of the flight h/w.

JSC-20149

This document takes for its purpose to define servicing concepts & req for both the SS and its satellite users so that the satellite servicing capability can best be utilized by the astrophysics community. The following are discussed under the heading, Satellite Servicing in the Astrophysics Program: servicing roles, repair, maintenance, upgrade, delivery & retrieval, servicing philosophy, logistics standardization, human productivity. Also covered: astrophysics missions and their servicing req; SS req for spacecraft servicing (berthing & positioning, P/L retention, storage, SS manipulator, MMU, resupply, storage, EVA, DMV, EMU); large observatories (Hubble Space Telescope, Gamma Ray Observatory, Advanced X-Ray Astrophysics Facility, & Space Infrared Telescope Facility).

J8400132

84/09/03 This document provides a required bi-monthly report of activities conducted in the study under contract #NAS8-34657 for the dates 7/1- 8/31/84. The document gives a brief list of accomplishments during the report period, which include the completion of the ground test article fabrication & assembly plan and the placement of raw material & hardware orders. Planned work, problem areas, and a financial summary are also given. Appendix A provides a SOW for the Positioning System for Deployable Platform System.

RICB-34657-BMR

84/09/13 This document consists of 2 basic forms of information. The first is the SSP Mission Data Base which describes each mission to be accomplished by the SSP. This data base is presented in Section II. The second form of information is a set of aggregations presented in Section VIII. Sections III & IV present definitions of the SSP functions and the resource parameters respectively. Section VI "Integrated Time-phased Mission Set" presents several groupings of missions from the total mission complement that have related objectives. Section IV presents the relation b/w missions & the functions they require. Section VII gives the mission active or inactive status thru the first 10 years of the SSP. Application of the definitions and constraints of Section III thru VII to the SSP Mission Data Base of Section II resulted in the Functional Resource Req of Section VIII.

J8400039

84/09/14 This document is a MSFC news release which announces the issuance of a

MSFC Release 84-79

84/09/14 NASA RFP to US industry for definition & preliminary design of a permanently-manned SS to be operational in LEO in the 1990s. Proposals are due 11/15/84. The RFP contains 4 WPs covering Phase B (definition & prelim design) of SSE. Following the 18-month study of Phase B study, NASA plans to move into the final design & development stage in 1987. Proposers for the definition & prelim design phase must have the capability to perform & manage the design, development, & test phase (Phase C/D) of their appropriate WP. Each WP is defined in this document.

This document is a Payload Integration Plan which provides the management roles & responsibilities, and a definition of the technical activities, interfaces, & schedule requirements to accomplish the integration, launch, & deployment of the Space Station Program elements with the STS. Management responsibilities, a P/L description, mission operations, SSP-to-STs interfaces, environmental analyses & interfaces, integration hardware, flight operations, launch & landing site support, safety, interface verification & testing, postflight data requirements, and a summary of optional service are examined.

JB400038

This document provides SS program participants with an updated collection of terminology used on the program. The material is intended as a contribution to enhanced communication w/respect to the SSP. The intent has been to couch each term in expressions within which it retains its intended association with SSP. Definitions occur at 3 levels: 1) generic definition-specific meanings, but used universally throughout the program and projects; 2) Unique project definitions- similar, but have different meanings for different projects within the program; and, 3) Unique program definition- primarily applied at the Program level, but may have sub-application at the project level.

JB400083

84/10/09 This document was generated as presentation material by MMA as part of a review of their study efforts. The major objectives of this study were: 1) define the testbed role of an early (1990-91) manned SS in satellite servicing technology development; 2) define in detail five priority satellite servicing technology development missions; 3) evaluate impacts of satellite servicing operations on SS, Space Shuttle, & DMV; 4) assess satellite servicing commercial user potential on an early SS. Task objectives of the study were: 1) definition of detailed TDM & satellite servicing; 2) analysis of design req; 3) definition of projected satellite servicing capability; 4) preparation of technology & flight experiment plan; 5) analysis of programatics; and, 6) assessment of potential industrial participation.

MCR84-1872

84/10/15 This document is a report which discusses momentum management for the Space Platform. External torques on Station are assumed gravity gradient and aerodynamic with both having bias and cyclic terms. The integrals of the cyclic torques are the cyclic momenta which will be stored in the momentum storage actuator. Various techniques to counteract the bias torques and center the cyclic momentum were investigated including gravity gradient desaturation by adjusting vehicle altitude, aerodynamic desaturation using solar panels and radiators and the deployment of flat plates at the end of long booms generating aerodynamic torques.

BENDIX-35349-FR1

84/11/01 The document is a bi-monthly progress report from RI which describes the work being done on the GTA. The reporting period ran from 9/1/84 through 10/31/84. The Santeck efforts are also discussed. Planned work, problem areas,

RICB-34657 BMR4

84/11/01 and a financial summary were given regarding the activities of RI.

This document includes an overview of both phases of the Definition Technology Development Missions. The objectives of Phase I were: 1) to define satellite servicing & establish SS req relative to providing servicing capability, using SS as a testbed; 2) to establish a technology development plan to describe basic technology development & tests, STS zero-gravity validation tests, & to provide a technology roadmap for satellite servicing; and, 3) to define conceptually a set of TDMs that would demonstrate an effective capability in the late 1990s. The objectives of Phase II were as follows: 1) to define the test bed role of an early manned SS in supporting the technology development required to conduct satellite servicing at SS; 2) to select five top priority TDMs & define them in detail (functional & operational analyses); 3) to evaluate the impact of satellite servicing operations on SS, STS, & OMV; and, 4) to determine the interest of commercial space operators in using servicing at SS.

SSS-FR-04-01

This document is a collection of reports prepared for the Office of Technology Assessment of the U.S. Congress. The study was designed to cover not only the essential technical issues surrounding the selection and acquisition of infrastructure in space, but to enable Congress to look beyond such matters to the larger context: the direction of American efforts in space. The information generated by this study was designed for possible use by Congress in the course of considering legislation, and also by the National Commission on Space. The document critically examines NASA policies, and lack of policies, in areas which affect the SS. Options to the type of in-space infrastructure wanted by NASA are proposed. Cost & budgeting are also given much attention. A history of the evolution of SS concepts is also given. This document is found in RSIC.

TL797C582 1984C3X

This document is a technical report which describes the second phase of the Definition of Technology Development Missions. Phase I of this study was provided in 1983 and this document is reporting Phase II. The objectives of the study were to define in detail 5 selected TDMs, to conduct a design req analysis to refine definitions of satellite servicing req, and to develop a technology plan that would identify & schedule prerequisite precursor technology development, associated STS flight experiments & SS flight experiments needed to provide on-orbit validation of the evolving technology. The purpose of phase II was to expand & refine the overall understanding of how best to use the manned SS as a testbed for demonstration of satellite servicing. Also, the purpose was to improve the definition of accommodation req necessary to support servicing missions, to develop an integrated TD&FE Plan, to outline a time-phased schedule for ground development & validation of technology required for servicing at SS.

SSS-FR-04-01

This document is the final report of a SS Automation & Robotics Planning Study. This study was in support of the Advanced Technology Advisory Committee. This study identifies automation and robotics technologies that can be advanced by requirements levied by the SSP. The methodology used in the study is to establish functional requirements for the operator-system interface, establish the technologies needed to meet these requirements, and to forecast the availability of these technologies. The overall topics covered in the study are: 1) characterization of OSI for an EV robot system to perform maintenance functions on the SS; 2) development of OSI scenarios; and, 3) assessment of associated technologies.

D483-10027-1

This document is volume 1 of a 2-volume set generated as a review of

MC884-1878

84/11/01 MMA's study activities. The objectives of the study, and thus the subject of this report, were 1) to define through analysis the potential ultimate conceptual design of SS systems to the highest level of automation that can be perceived to be accomplished by circa 2000 (this involved the overall system & selected subsystems (ECLSS, EPS, DMS)) and 2) to define through analysis the system-level applications of automation technology for assembly, construction, repair, and modification of a SS and its various elements. The following is covered: System Automation, Assembly & Construction, and Technology Projections.

This document is Volume II of a 2-volume final report on the SS Automation Study. Volume II presents the technical report. The purpose of this study was to develop informed technical guidance for NASA personnel in the use of autonomy & autonomous systems to implement SS functions. The California Space Institute was assigned responsibility for study management. Dr. Robert Frosh chaired the effort. The objective in the study, as reported herein, related to projection of a futuristic SS & the type of scarring necessary for evolutionary implementation: define through analysis the potential ultimate design of SS syst to the highest level of automation that can be perceived to be accomplished by circa 2000 (sys & subsys are involved); and, define through analysis sys-level applications of automation technology for construction, repair, & modifications of a SS & its components.

MCR84-1878

84/11/15 This is part of Boeing's response to NASA RFP 9-BF-10-4-01P, volume 2 of the 4-volume proposal. The volume provides Boeing's approach to organizing, managing, and controlling the definition and preliminary design phase for WP-01. provides the man-tended and permanently manned Station management plan. It describes Boeing's approach to preparing the implementation plan, schedule, and cost estimates for the follow-on design and development program in accordance with design and development phase WBS and dictionary (DR-08), design, development and operations phase cost document (DR-09), and project implementation plan (DR-10).

D483-10001-1

84/11/26 This document is a single-page monthly progress report in which MDAC is reporting its work in the On-orbit Maintenance Operations Study. The following topics are covered in the report: 1) Work performed during last reporting period; 2) Work to be performed in next reporting period; 3) current problems; 4) corrective action. The subjects of the report: ORLA Maintenance Costing; maintainability, reliability, & safety analysis; SS Phase B.

MDAC8-35982-FR-6

84/11/27 This document is the technical report accompanying the GE SS automation study. GE was assigned to assess automation technology required for remote operations, including manufacturing applications. In carrying out this assignment, GE assessed over 100 potential SS missions through an extensive review of proposed SS experiments and manufacturing concepts. In-depth development of automation req for two manufacturing design concepts: 1) Gallium Arsenide Electroepitaxial Crystal Production and Wafer Manufacturing Facility and 2) Gallium Arsenide VLSI Microelectronics Chip Processing Facility. In this document for both of the preceding concepts the following are listed: process description, equipment requirements, and automation concept assessment.

GE5-2512-FR-TR

84/11/30 This document contains an overview of both phases of the Definition of Satellite Servicing TDMs for Early SS but concentrates on Phase II. This 26-month study was scoped to meet the following objectives: 1) to define the testbed role of early SS in context of a plan for the development of satellite servicing

Z400.DMW.014

84/11/30 capability; 2) to define satellite servicing TDMs to be performed on an early SS; 3) to assess impacts of satellite servicing operations on SS, STS, & OMV; 4) to assess satellite servicing potential on early SS.

This document is a news release which announces the awarding of a \$2 million contract to TBE to study aspects of an orbiting research facility. The 2-year contract is for a basic conceptual study of equipment & other aspects of a pressurized microgravity materials sciences lab module to be orbited. MSFC is charged with management of the design of a common module, several of which would be used for the SS. This common module would be designed for living quarters, lab research, manufacturing, logistics, & storage. TBE is to study the req that scientific research & commercial manufacturing will impose on the common module and to identify specific equipment & h/w that would go into the module, potential commercial R&D activities in which the module could be used, and to establish operational req for the govt, academic institutions, & industry. The module is to be called the Microgravity Materials Processing Facility. MP, biotechnology, physics & chemistry could be studied. It may become part of the permanent SS.

MSFC Release 84-96

This document reports on a study the objectives of which were to define the testbed role of an early Station for the construction of Large Space Structures (LSS). This definition was accomplished by defining the LSS technology development missions (TDM) identified in Phase I of this program. Design and operations trade studies were used to identify the best structural concepts and procedures for each of the TDMs. Details of the TDM design were then developed along with their operational requirements. Space Station resources required for each mission, both human and physical, were identified. The costs and development schedules for the TDMs provide an indication of the programs needed to develop these missions. The results of the study point out the need to rely on the resources of the Space Station in the design of LSSs so that they can be constructed and checked out at the Station. It also identifies the need to desing necessary resources in to the Station to accommodate LSSs.

D180-27677-2

This document reports on TRW's findings re its study of Definition of Satellite Servicing TDMs for Early SS. The overview purpose of the study was to generate the rationale, definition, & req for performing satellite servicing TDMs using the early SS as a test bed. Major objectives were: 1) to define the testbed role of an early SS (1992) in context of a plan for the development of a satellite servicing capability through technology demonstration activities, both ground & flight; 2) define the detail satellite servicing technology development priority missions to be performed on an early SS including cost & schedules; 3) to assess impacts of satellite servicing operations on the SS, STS, & OMV; and, 4) to assess the potential of satellite servicing as a business venture for private industry.

Z400.DMW.014

84/12/01 This document appears to have been prepared as presentation material for a briefing concerning the Space Station Systems Technology Study. An attempt is made to accomplish 3 major tasks: 1) refine concepts for each of technology study, use concepts to isolate specific technology options, conduct comparative studies of options, and identify candidate high-leverage technology advancement items; 2) evaluate candidate options cost, benefits, schedule, and life cycle; 3) prepare technology advancement plans for selected items. 106 technology issues were initially identified and prioritized. Five technology areas were selected for study: data management architecture; data management data bus; long life thermal management; integration of automated housekeeping; and attitude control.

D180-28364-3

DATE	ABSTRACT	ID NO.
84/12/01	The study had the following objectives: identify, quantify, and justify high leverage technology advancement items in autonomous functional control, attitude control impacts, controls and displays for DMV, OTV, and spacecraft servicing.	
84/12/20	This document is a compilation of information which describes a given SS mission, that is a particular P/L. It is one of a series what is being published for each of the SS missions as listed in the Mission Requirements Report prepared by the SS Mission Requirements Working Group. A key reference for the information presented herein is the Langley Space Station Data Base, an automated file including an overview of objectives, characteristics and req of each mission. Langley data are highlighted in boxes. The information in this book is intended to provide the configuration, subsys, & operations concept developers of the SS w/sufficient detail to permit individual & aggregate accommodation of missions. This document is a precursor & primary input/companion to the SS Customer Accommodation Plan. That document is written from the viewpoint of SS P/L integration engineers concerning a given mission. It, in essence, responds to the objectives, req, & plans in the rest of this document.	J8400070
84/12/20	This document reports the activities of TRW's SS Automation Study efforts which was to address the definition of the technology req for automated satellite servicing operations aboard the SS. The major objectives of the study were: 1)to determine the benefits that will accrue from using automated systems onboard the SS in support of satellite servicing; 2)to define methods for increasing the capacity for, & effectiveness of, satellite servicing while reducing demands on crew time & effort & on ground support; 3)to find optimum combinations of men/machine activities in the performance of servicing functions; & 4)to project the evolution of automation technology needed to enhance or enable satellite servicing capabilities to match evolutionary growth of the SS.	Z410.1-84-175
85/01/01	This document is the fifth bi-monthly progress report from RI regarding GTA. Completion rates of machining ops and inspection rates are discussed. Planned work, problem areas, and a financial summary are given.	R1CB-34657 BMRJ
85/01/16	This document is a progress report for the period of time from 3 December 1985 through 3 December 1986 for the Space Station Body Mounted Radiator (BMR) Systems study. The following topics were covered during this period: the effect the servicing bays have on BMR heat rejection was determined for different beta angles; trade studies on radiator configuration were continued; the effect of the Orbital Maneuvering Vehicle, the Orbital Transfer Vehicle; and payload servicing bays was studied.	3-14000/6R-4
85/01/28	This is the Canadian Space Station Phase B statement of work as shown in a letter from K.H. Doetsch to P.E. Culbertson of NASA/HQ. The letter was an enclosure to a memo circulated by E.E. Beam of MSFC in August 1985. The letter from Doetsch contained an enclosure which was a general description of the proposed work packages for the Canadian contribution to the Space Station Program on which the statement of work will be based. The following work packages are outlined: 1- construction and servicing; 2- solar array subsystem; 3- remote sensing platform; and 4- user development program.	CANADA-WP-SOW
85/02/01	This document is one of four contained in the SSP Definition & Req Document which contains various pieces of information regarding international ideas & participation in the SSP. This document describes reference	JEM-RC

85/02/01 configurations of JEM & preliminary interface conditions b/w JEM & NASA's SS. The purpose of this document is to aid in the definitions of the JEM & of the interface b/w JEM & SS, for assuring the feasibility of acceptable mission accommodations, & for providing the info of Japanese study status to NASA. Also shown are configurations of JEM middle & growth phases in preliminary conceptual form.

This document is one of four international documents contained in the SSP Definition & Req Document. These contain various pieces of info concerning international ideas & participation in the SSP. This document describes the overall Japanese phase B activities at Level B. Phase B activities are planned for the purpose of defining systems of JEM attached to SS & carrying out prelim design of JEM including the study on its development & operations plans. The following are the fundamental scopes of Phase B and consequently examined here: 1) to define the innovative concept of JEM; 2) to define & accomplish the required SE&I activities associated w/JEM; 3) to define initial & growth JEM & determine the optimum participation scenario in SSP; 4) to define the interface b/w JEM & SS; 5) to make the development & operations plans on JEM; 6) to carry out the prelim design of the initial JEM & conceptual design of the growth JEM; 7) to plan user accommodation of JEM; 8) to develop critical element technologies re JEM

JEM-SOW

This document is Volume II of the final report on the SS Systems Technology Study and it has the objective of identifying, quantifying, & justifying the advancement of high-leverage technologies for application primarily to the early SS. The objective has been addressed through a systematic approach tailored to each of the technology areas studied. This volume presents the results of the technical effort. Autonomous functional control, attitude control impact from structural dynamic motions, and controls and displays for DMV, DTV, & s/c servicing, flight ops, and functional operation are discussed in this volume of the report.

D483-10012-2

This document is Volume III of the final report on SS Systems Technology Study and it provides the technology advancement program plans for the critical or high priority technology items identified in the system trade studies in Volume II. Advancement program plans were developed for the following areas: Integrating Controller for SS Autonomy and Controls & Displays.

D483-10012-3

This is the executive summary of the final report for the Station Systems Technology Study add-on task. The study objective was to identify, quantify, and justify advancement of high-leverage technologies for application to the early Station. The 3 study areas addressed in the add-on task are: 1) autonomous functional control of subsystems; 2) the impact from structural dynamic motions on Attitude Control; and 3) controls and displays for DMV, DTV, spacecraft servicing, flight operations, and functional operation. Design concepts were refined. Costs, benefits, schedules, and life cycle costs for each of the options were evaluated. This volume presents a summary of the work performed to select the high leverage items.

D483-10012-1

This is the Executive Summary, volume I, of the final report for the Station Systems Technology Study add-on task. The overall study objective is to identify, quantify, and justify the advancement of high-leverage technologies for the early Station. Research plans were developed for each of the selected high-leverage technologies. The objective was fulfilled through a systematic approach tailored to each of the technology areas studied. Three study areas

D483-10012-1

- 85/02/01 were addressed in the add-on tasks: 1) autonomous functional control of Station subsystems, 2) impact from structural dynamic motions on Attitude Control, and 3) controls and displays for DMV, OTV, spacecraft servicing, flight operations, and functional operation. Design concepts were refined. Costs, benefits, schedules, and life cycle costs for each of the options were evaluated. This volume presents a summary of the work performed to select the high leverage items.
- 85/02/18 This document is the ESA's Columbus Preparatory Programme, and it has the following objectives: to study all elements identified under the Columbus initial operating capability segment, part of which may be retained for a cooperative participation in the US SSS and to develop supporting technologies. This document will cover the definition studies of user-attractive elements & technological research work in the area of manned & unmanned sys. The document will also take into account the compatibility with the future European launch systems. Also covered in the document: objectives of the Columbus System Engineering Task; procurement approach; management structure for Phase B1; and, documentation. Included also are appendices: I A- System Requirements, I B- SOW, I C- Management Plan; II- Contract Conditions; III- Special Conditions of Tender; and, IV- Evaluation Criteria. RFB/C-5250/65N1AB
- 85/02/25 This is a report of the Advanced Technology Advisory Committee on Station automation and robotics. An executive summary is included. The following topics are also addressed: designing for growth in automation; robotics; computer science & knowledge engineering; interactions with private and government sectors; broader opportunities for automation and robotics; and advancement and implementation. CSI/85-01
- 85/03/01 This document is the sixth bi-monthly progress report from RI regarding GFA. Santek's manufacturing progress, planned work, problem areas, and a financial summary are given. R108-34657 BMS
- This document presents a preliminary design & performance analysis of a thermal management system for a high power (75kW) LED man-rated SP. Electrical Power is provided by a SA/regenerative fuel cell system. The TMS consists of single-phase & two-phase internal pressurized module thermal transport loops using water as the transport medium. Body-mounted heat pipe radiators are used for metabolic heat rejection. The internal TMS subsys interfaces w/ a two-phase ammonia centralized thermal bus which transports heat to a steerable radiator. Subsys control schemes are presented for maintaining equipment cold plates w/in design operating temperature limits throughout the maximum design heat rejection histories, & during low power off-design operation, including operation under random heat rejection conditions. The LM & Fuel-Cell Cooling loop have autonomous TMS subsystems. Prelim design & sizing of major components & subsys specifications & weight summaries are also presented. SSD85-0017
- This document reports on a study, the purpose of which was to develop a methodology for determining the most practical SSP maintenance concept which will minimize risks & life cycle costs while maximizing mission performance, safety, & crew productivity. The report gives information regarding the 4 major tasks of the study: 1) to identify h/w items that would have a representative range of generic SS maintenance actions; 2) to define a methodology for determining the most practical SSP maintenance concept; 3) to apply the methodology for determining derived in Task 2 to the h/w items identified in MDC-H1376

- 85/03/01 Task 1; and 4) to submit a final report including a compilation of results for Tasks 1 thru 3 plus recommendations for future in-depth studies. H/W design, program reqs, maintenance data base, mockup & simulation options, and IVA are also considered in the discussion.

This document was prepared as a consequence of the congressionally mandated NASA study of A&R for use in the SS & this report was prepared for the U.S. House of Representatives and Senate Committees on Appropriations. This study drew on work by groups both within NASA & outside NASA, in the academic & industrial communities. The Executive Overview, Volume I, presents the major findings of the study & recommends to NASA principles for advancing A&R technologies for the benefit of SS & the U.S. economy in general.

NASA TM-87566

This document was produced as a consequence of a congressionally mandated measure that NASA study A&R for use in SS & prepared this report to the US House of Representatives & Senate Committees on Appropriations. The study drew on work by groups both within NASA & outside NASA, in the academic & industrial communities. The Technical Report provides background information on A&R technologies & their potential & documents the following: relevant aspects of SS design; representative examples of A&R applications; state of the technology & advances; considerations for technology transfer to US industry & for space commercialization. This volume provides guidance for prospective SS contractors to direct their efforts toward a planned advance in these technologies.

NASA TM-87566

- 85/03/08 This document is the statement of Aaron Cohen, the Director of Research & Engineering at JSC & Chairman of SS Advanced Technology Advisory Committee. The enclosed testimony reviews activities in preparation of the report to Congress on the potential for advancing A&R & for the US economy.

NASA-SSTG-3/85

- 85/03/12 This document is a WP-2 Phase B readiness report and has the following objectives: to identify & describe the degree to which management systems are ready for the Phase B portion of the SSP; to obtain concurrence with systems & options presented; and, to provide an initial "point of departure," coordinated across the program, to serve as a datum or reference which can then be modified as F(t). The document contains no formal, written text but utilizes charts & lists in stead in order to relay information.

JSC-WP2-RRF

- 85/03/14 This document is testimony of Mr. Robert A. Frosch before the Subcommittee on HUD & Independent Agencies of the Senate Committee on Appropriations as heard on 3/14/85. Mr. Frosch's statements concern the work done on the A&R Panel, which was a group established per an agreement between NASA & Congress in an effort to formulate a policy on A&R for SS.

NASA-SHIA-3/85

- 85/03/26 This document reports the findings of a study conducted by SRI with the following goals: 1) to provide guidance w/respect to state-of-the-art in AI-based technologies; 2) review the results of the concept design contractors to determine the AI capabilities required by the designs; 3) to delineate a series of demonstrations that would indicate the existence of these capabilities; and, 4) develop a R&D plan leading to such demonstrations. Advanced techniques for the SS's information sys were also to be investigated. The report describes R&D projects in automation technology which yield essential advantages of crew safety, productivity, increased autonomy, & augmented capability for SS. Also described herein are the areas in which NASA needs to continue support for

SR12-11864-ES

85/03/26 automation technology: teleoperation/robotics, sensing, expert systems, planning, computers, & man-machine interface. Also included are an analysis of technology needs, plan for developing R&D plan, and the design for automation.

85/04/01 This document addresses the IOC & growth of the manned SS & unmanned SPs. Section 3 presents a summary of the configuration description, subsystems, & key evaluation results for the SS & SPs. Sections 4 & 5 contain key design req & descriptions of the configurations of the manned core SS & SP respectively. A functional evaluation is made of the configuration's ability to accommodate P/Ls, support crew & logistics operations, accommodate integrated systems req, & to be assembled & grown efficiently. Detailed subsystem descriptions & rationale used to select the specific subsystems, are also presented. The following subsystems were examined: structure, mechanisms, thermal control, electrical power, C&T, information & DMS, and GN&C.

JSC-19989

This document is a large "blueprint-type" chart which gives an overview of the hardware layout of the SSS. The document begins with a broad outline of the Space Operating Sys, including a discussion of the SSPEs (SS Ground Support Sys, Logistics/Resupply Sys, Customer Flight Sys, SSP Vehicles/Spacecraft, Ops Crew. Also discussed are: SS Transverse Boom Sys; Tower Sys; U/B Tower Subsys; U/B Solar Attached P/L Facility; OTV Accommodations; Modules (LM, HM, Lab modules (science & material science)); Airlocks; SPs (POP & COP-PA, SP subsys); energy storage; RCS; OMV; and, Propulsion.

RI-SSSD-HT

This document is a large "blueprint-type" chart which provides a breakdown of the functions which are involved in the SSP. Beginning the broad category of Conduct Space Ops, the charts breaks down into Ground Sys Ops, Unmanned S/C Ops, ELV Ops, & STS Ops. The following are breakdowns also: Implement SSP Sys Acquisition (Acquisitions of SSS, COP, POP, & Growth Sys); Assembly/Deployment of IOC SS, COP, & POP; Ground Support; Logistics & Resupply; Microgravity Lab Ops; Low-gravity Lab Ops; Accommodate Customer P/L/Equipment; Perform P/L Staging for Earth Return; Provide Support to Elements tethered to SS; Accommodate OMV Busing, Servicing, Maintenance; Perform SS Housekeeping; Perform Ops for COP, POP, OMV; and, Implement Growth Sys Block Changes. See also Rockwell's "Hardware Tree."

RI-SSSD-FI

This document is a report which addresses the IOC & growth of the Manned SS & unmanned SPs. Section 3 presents a summary of the configuration description, subsystems, & key evaluation results for the SS & SPs. Sections 4&5 contain key design reqs & descriptions of the configurations of the Manned Core SS & SP. A functional evaluation is made of the configurations's ability to accommodate p/l's, support crew & logistics operations, accommodate integrated systems reqs, & to be assembled & grown efficiently. Detailed subsystem descriptions & rationale used to select the specific subsys, are also presented. This report is a revised & edited version of the report which was produced in August 1984 to publish the results of the "Skunk" works held at JSC.

JSC-19989

This document is a revision of the report produced in March '85 by SRI w/the following goals: 1)to provide guidance w/respect to state-of-the-art in AI technology; 2)to review the results of the concept design contractors to determine AI capabilities required by designs; 3)to delineate a series of demonstrations that would indicate the existence of these capabilities; and, 4) to develop a R&D plan leading to such demonstrations. The following topics are covered: concept designs; an analysis of AI technology needs; design for

SRI2-11864-TF

DATE	ABSTRACT	ID NO.
85/04/01	automation; teleoperation & robotics; sensors; expert systems; planning; SS info sys; & man-machine interface. References are given for each of these topics. 5 Appendices are listed: A-Pacesetter Technologies for Telepresence & Robotics; B-Teleoperation & Robotics scenarios; C- Advanced Memory Technologies; D-Collinear Hierarchical Decompositions; and, E- Computer-Communication Security.	
	This document presents a set of new standardized space data handling techniques which have been developed by NASA in partnership with 18 other national & international space agencies. The intent of the document is to present the new standards to the SSP as a candidate set of solutions to the complex problem of designing such an evolutionary data system. Six data handling technical disciplines that are critical to space missions, and for which commercially available standards are either inapplicable or immature. These are: telemetry, telecommand, radio frequency & modulation, time codes, standard format data units, and radiometric & orbit data.	J8400096
	This study plan contains MMA's approach to performing the proposed CM Power Sys Network Topology & H/W Development Program. Tasks are described which will assure systematic development & evaluation of program results, & will provide necessary management tools, visibility, & control techniques for performance assessment. This study plan was intended to become the basic guideline document for the program. The overall objective of this program was to define & develop candidate power sys network topologies for SS CM & to provide necessary h/w for test & evaluation.	MCR-85-621-000
85/04/10	This document is intended to review the overall MSFC status and plans relative to Phase B initiation. The following major topics are discussed: Center organization & staffing status, SE&I plan, Engineering Cost Activity, TMIS status, and Project Schedules.	MSFC-PB-RR
85/04/12	This document is a memorandum from Donald Andrews/KA01 to George Butler/EG21 regarding the Review of the SSP Design Criteria & Practices. The memo addresses certain issues which the SSPD raised concerning the above titled document. In summary, the suggestions which Mr. Andrews makes regarding the document are that the document should not be elevated above the status of "guidelines." The issues should be addressed specifically in systems specifications & support program cost objectives & goals.	MSFC-KA01(85-54)
85/04/15	This document was prepared in accordance with DR #5, ADP of Contract NAS8-36525. The following topics were discussed in the document: advanced development & technology; ADP for initial elements of SSP; advanced development implementation for initial SSP. This plan describes the five advanced development activities that will be emphasized during Phase B to demonstrate their feasibility, establish their performance, and quantify the cost & schedule risk associated with their incorporation into the development-phase baseline. A complete description of each technology is provided along with a schedule & task flow for each activity. The hardware and/or software produced under each activity is identified along with the proposed use of NASA facilities.	SSP-MMC-00001
85/04/23	This document contains organizational information concerning RI's & JSC's SS operations. Charts providing the following types of information are given: personnel chart for RI's SS Systems Division, personnel chart for RI's technical lead for engineering & operations studies, personnel charts of the different branches which make up the JSC SS office. The management plan for	SS-WP2-KOM-RI

DATE	ABSTRACT	ID NO.
85/04/23	DR-01 of WP-02 is also given. A personnel chart for RI's Houston SS operations is given, as is a description of RI's Houston office's tasks.	
	This document is a briefing concerning JSC's organization & obligations w/in the SSP under WP-2. The agenda for a meeting held in order to brief this subject is provided. Organization charts for the JSC SSPO & Project Engineering Office are given, as well as their responsibilities. Other subjects covered include: integrating systems project elements, resource systems integration project, manned sys project elements, SSIS, EVA h/w elements, DTC process, Phase B- SS Sys Definition & Prelim Design, SE&I process, inter-WP integration process, Level C Req Development, Level B req, MTO, configuration options, EMS development, & cost methodology.	S-85-06563A
85/05/01	This document contains the options development for the Design Options Category. The following, under Task 2 of the SSDS, are considered: 1)software (data management, resource management, distributed operating sys); 2)system architecture (fault tolerance, autonomy/automation, system growth, sys interfaces, SSDS/Payload, man/machine); 3)system security; 4)time management; 5)communications (space, wide area, local area); and, 6)network performance assessment.	MDC-H1940
	This document is a plan which provides the management roles & responsibilities, & a definition of the technical activities, interfaces, & schedule requirements to accomplish the integration, launch, & deployment of the SSPEs with the STS. All services to be furnished by the STS to the SSP under this PIP shall be furnished by the STS using its best efforts. The following headings are covered in the document: Management Responsibilities; Payload Description; Mission Operations; SSP-to-STS Interfaces; Environmental Analyses and Interfaces; Integration Hardware; Flight Operations; Launch and Landing Site Support; Safety; Interface Verification and Testing; Postflight Data Requirements; and, Summary of Optional Services.	JSC-18508
	This document is the seventh bi-monthly progress report regarding GTA. The report covers the period from 3/1/85 through 4/30/85. Diagonal assemblies, longeron assemblies, housing assembly, deployment rails, battena assemblies, jacksaw assemblies, support, end adapter, precompression assemblies, unlocking mechanisms, & utility trays are discussed. Santek Build schedules are given. A progress summary, list of planned work, problem areas, and a financial summary are also given.	RICB-34657 BMR7
	This document is volume III of the Task 2 studies under the SSDS. This volume contains the options development for the Programmatic Options Category. The specific programmatic options are as follows: 1)standardization/commonality; 2)system management; 3)system development (hardware procurement, software development and system integration testing & verification).	MDC-H1940
	This document reports on SS Data System Analysis/Architecture Study (Task1) of which the primary task is to define the functional & key performance req. The primary purpose of the requirements development activity is to provide a coordinated, documented req set as a basis for the sys definition of the SSDS and for other study activities. Key objectives of the req development task are shown in this report: 1)to identify a conceptual topology & architecture for the end-to-end SSIS; 2)to develop a complete set of functional req and design drivers for the SSIS; 3)to develop functional req and key performance req for the SSDS;	MDC-H1343

85/05/01 and 4) to define an operating concept for the SSIS.

This document reports on Task 2 activities of the SSDS. The primary objective of Task 2 is the development of an information base that will support the conduct of trade studies (Task 3) and provide sufficient data to make key design/programmatic decisions (Tasks 4&5). This includes the establishment of option categories that most likely to influence SSDS definition, identification of preferred options in each category, and the characterization of these options with respect to performance attributes, constraints, cost, & risk. The Task 2 options development activity was initiated early in the study to: 1) facilitate data gathering in high-tech areas that require long-lead-time efforts; 2) provide supporting design & technology perspective to Task 1 activities; & 3) support an early extraction of design/development drivers.

MDC-H1940

85/05/03 This document contains 4 sections: 1) Our Special Working Group- describes the composition of special working groups which will review RI's advanced development activities & prepare recommendations for revisions & additional technology pursuits; 2) Technology Assessments- presents the results of the initial IOC SS h/w assessment that lead toward initial selection of advanced technology items; 3) Ada Technology Objectives & Plans- describes the team Ada activities which supplement the RI team ADP; & 4) Advanced Technology References- divides references in 3 source categories & organized into 9 disciplinary categories (advanced tech, expert sys, A&R, structures, thermal, DNS, C&T, GN&C, & crew systems.

SSS85-0027

This document describes RI's approach to accomplishing the WP-2 tasks described in the contract SOW & is intended to serve as NASA's primary study control document for WP-2 activities. The objective of this plan is to document SS Definition & Preliminary Design Study activities, schedules, & contract resources, & communicate the plan for accomplishing study objectives to NASA, RI management, & study team personnel. The following are discussed: SS Reqs; task descriptions; RI's innovation plan; SE&I activities; study flow diagram; study milestone schedule; time-phased manloading; key subcontractors; contractor required documentation; management communications & data system; organization of SSDS; and, program planning & control. Technical considerations were made in study contract task, schedule, & resource planning.

SSS85-0010

This document is a report which identifies Rockwell's capital investments and test facilities and the IR&D programs that have direct benefits to the WP-2 ADP. The first section covers the capital investments made that were to provide support to RI's team IR&D in keeping with Part III of DR-05. Capital investment commitments made for WP-2 purposes & the costs involved are outlined. The second section is composed of tables which were derived from SS-related IR&D programs for each of the 4 team members (RI, Grumman, Harris, & Sperry); and the tables provide summaries for each of the team member activities. Data sheets follow each of the summary tables & provide an outline of IR&D activities by team members.

SSS85-0026

This document is a review copy of the management plan produced under DR-01 which presents a clear & concise definition of the requirements which will be the basis for our design and describes the analysis studies, and design effort quantitatively in terms of task content, schedule, & magnitude of effort. With SE&I, details of RCA's role in aiding NASA SE&I have been given. In this document, RCA's approach to innovation has been explained. The organization of

RCA-DR01-1

DATE	ABSTRACT	ID NO.
85/05/03	the RCA team, its members, the operating organizations, and the personnel are described. Methods used for financial & schedule control & performance measurement are discussed. The following are the sectional divisions of the document: 2)Requirements Matrix; 3)Task Descriptions; 4)Planning for Innovation; 5)Managing SE&I; 6)Study Flow; 7)Program Milestones; 8)Time-Phased Man-Loading; 9)Organization; 10)Documentation Required for SSP; 11)MCDS; and, 12)Program Control for SSP.	
85/05/06	Application Software is directly tied to the various module subsys such as power, thermal, & ECLSS. Application s/w is to be the enabling function for the data acquisition & control for each subsys. The application s/w under discussion will automate the functions of the following SS subsys controller: electric power, thermal, internal communication, propulsion & reboost, ECLSS, OMV/DTV accommodation. Described is the application s/w reqs & proposed architecture. In addition, the trades studies & analyses that will drive out the ultimate design configuration are identified.	D4B3-50004-12
85/05/09	This document contains information concerning the MSFC PDP 85-2 activities. The emphasis of this activity will be to identify the FY-86 SS Definition Phase Operating Plan. A schedule of meetings is included, as are the groundrules for the study. MSFC PDP 85-2 funding guidelines are also provided. PDP 85-2 schedules and tasks are also described.	MSFC-KA02(85-02-07)
85/05/10	This document encloses lists of commonality candidates which have been generated in compliance with the negotiated delivery of WP3 elements to be considered for commonality. A&R commonality candidates are included in the main body of this document. Commonality candidates for each end item (lab module, SP, servicing, & attached P/Ls) are given in separable enclosures, as is a listing of data systems (SSIS and C&T) commonality candidates.	GE/TRW-CC-WP3
85/05/16	This document is a letter, plus enclosures from Maryann Pensiero of RCA to Ron Britner, a technical manager at GSFC. The letter informs Britner that 7 pages were inadvertently left out of an earlier submission which had been made to GSFC concerning commonality lists. Those missing commonality lists were enclosed with the letter. The information was to be supplied under WP-3. The commonality lists concerned 6N&C.	RCA-SS-SEMI-PPL
85/05/17	This document contains proposed lists of options which have been generated in compliance with WP3. Option candidates are listed for each end item (SLM, platform, servicing, and attached P/Ls). A&R options are also listed in this document. The following is a list of options which are covered under customer servicing: 1)operational modes & concepts; 2)configuration; 3)system/subsystem engineering; and, 4)fluid system servicing.	GE/TRW-WP3-PLD
	This document presents the expanded WBS for WP-01 of the SSP & the WBS Dictionary. The WBS leveling criteria are explained & the maintenance responsibility of the WP-01 WBS Dictionary is explained. The WBS & dictionary were developed to: support total SS WBS; provide structure for the life of the SSP; provide basis for structuring WP responsibilities & i/fs; provide basis for design, development, & operation cost estimates; provide framework for collecting & monitoring program actual costs; allocate & control reqs & configs; provide for traceability & accountability; provide for compatibility w/specification end-item deliverables; provide structuring for sys T&V reqs; provide the detailed WBS for each advanced development activity in accordance	D4B3-50008-1

- 85/05/17 with DR-05; provide for structuring PIP to define scope/reqs of each element, approach for accomplishing each element, & integrate resources generated under DR-09; and define products/services.
- 85/05/23 This document provides the specific design reqs & reference config as provided by NASA for the SS DMV accommodations, & DMV Servicer Kits. Sys reqs, including those related to safety, reliability, contamination, & data management, as found in the reference C-4 attachment to the RFP, are provided, as is a general DMV/DTV Accommodations reference config. This document describes the current reference config of the SS DMV & DTV accommodations, including h/w elements & ops procedures plans. DMV/DTV accommodations reqs (functional, design, electric power, thermal, data management, communications, habitability, EVA, fluid management, i/f, sys T&V, maintainability, reliability, safety and are examined. BL config data for DMV & DTV are given. Trade studies & analyses for DMV & DTV accommodations trade lists are discussed. D483-50004-11
- 85/05/30 This document contains the results of Task 1 of the SS Data System study which has generated a detailed set of functional reqs, which can be used to size capacity throughput & traffic loads on data buses, communications links & distributed processors of candidate SSIS. This study has considered the general info handling concept of SS, along w/its missions & ops. Info sys & data sys performance reqs have been generated in systematic tabular format. Chapter 3 describes overall methodology to perform the tasks of this study. The conceptual architecture for each element of SSIS is discussed in Chapter 4; subfunctions are identified consistent w/current SS ops concepts so that details relating to data rates, commands, memory reqs, & monitoring parameters could be determined. Req, options, subfunctions, & key algorithms are listed. This document is comprised of 2 separate parts. SSD-TR-101-5-85
- 85/05/31 This report describes the work performed during the report period for the Space Station Attitude Control System Test Bed Modification / Refurbishment of Skylab's control moment gyros (CMG) and related equipment. Efforts during this reporting period related to modification and refurbishment of Skylab's CMGs impacted only the inner gimbal assembly, the sensor pivot assemblies, the final check out test equipment, and internal CMG wiring. Also reported on are the meetings which were held between Bendix personnel and MSFC EB44 and EB22 personnel in order to understand the requirements for the Attitude Control System Test Bed Facility. The results of these meetings are also given. BENDIXB-36408 PR1
- 85/06/01 This document describes a thermal assessment of the Spacelab EM002 pallet to be used for on-orbit maintenance & refurbishment of the space telescope. The Active TCS (electric heaters) and the Passive TCS (PTCS) are considered. The thermal performance of the EM002 pallet is evaluated for the extreme environments which are possible for the mission. Emergency or contingency entries for these extremes are also addressed. MDC-W502E
- This document is a data package which forms the Canadian data products drop for the SS program RUR-1. Data is presented along the 19 themes defined by NASA, for an integrated servicing & test facility concept being developed by Canada. Included is the Canadian Engineering Master Schedule for the ISTF and a set of data products description. The 19 themes under data product are: STS performance capabilities, SS operations req, resource req, design to cost, customer req, safety, architectural concepts, growth, module pattern & size, customer accommodations, power option, function allocation, advanced development ISTF-RUR1

85/06/01 program, automation & robotics, logistics, commonality, maintainability, verification & checkout, & international participation. This document contains no formal, written text, but utilizes charts, lists, & diagrams.

This document is a monthly report for May 1985 regarding the ECLS Integration Analysis. It is to provide NASA with visibility on project performance, status, problems, and accomplishments. The document contains the following: a quantitative description of work performed during the work period; a summary of work planned for the next reporting period; a summary of problems & concerns; and, a summary of manpower expended in the current month, cumulative manpower expenditures to date, estimate of physical completion of contract, & explanation of significant variances.

ECLS R0001

This document is a monthly status report which discusses MDAC's contract performance, project status, & technical accomplishments for period 4/19-5/31/85. The report also contains action items, agreements, & "top ten" management items. The following topics are discussed: SE&I (plan implementation, support tasks); preliminary design (interface reqs, sys test & verification); advanced development (ADP for IOC, AD implementation for initial SSP, CA, ops planning, product assurance, design & development phase planning, study management). Areas for special management attention are also pointed out, as well as a list of MDAC managers & task leaders.

MDC-H1982

This document is divided into 2 major sections (sections 9 & 10). Section 9 contains reporting of the current contract efforts directed to NASA Level B- SE&I tasks; 19 major themes are presented. They discuss the following: STS performance capabilities & SS; SS ops reqs; resource reqs; DTC; customer reqs; safety; architectural concepts; growth analysis; module pattern/size; CA; power option; function allocation; ADP; A&R; logistics; commonality; maintainability; & verification. Section 10 discusses SE&I Support Tasks with the intent of providing Level C data to support Level B activities during RUR-1, RUR-2, & IRR. The following areas are considered: overall architectural analysis; growth analysis; DM analysis; C&T analysis; loads analysis; thermal analysis; control analysis; assembly sequence definition; STS prox ops/berthing analysis; crew i/f analysis; resource integration analysis; and, STS i/f analysis.

MDC-H1983

This document is merely a continuation of Book 2 and concerns itself with the reference config analysis. For more details see the abstract to MDC-H1952 Book 2.

MDC-H1952

This document is the June 1985 monthly report for the Attitude Control System Test Bed Modification / Refurbishment of Skylab's control moment gyros (CMG) and related equipment. The report describes the work performed during the report period and forecasted for the next month. The two areas reported on were modification and refurbishment of Skylab's CMGs (including a discussion of inner gimbal assembly, sensor pivot assemblies, final checkout equipment, and design techniques were established to modify the outer gimbal ring), and CMG refurbishment.

BENDIX-26405 F&I

This document reports on the analysis of the reference SS config (power tower) and gives an assessment of its capability to meet the SS reqs thru the following 5 sequential steps: allocation/analysis of the req; refinement of the reference SS definition; evaluation of its ability to meet the reqs;

MDC-H1952

85/06/01 identification of shortcomings/discrepancies in their ability; & identification/analysis of options to improve the reference concept response to the req. Included herein are the following: approach/methodology; IOC reference config description; System analyses (launch packaging/assembly, orbit altitude, loads & structures, prox ops, contamination, SA, PA, crew interface, flight ops, prelaunch support); subsystem analysis (assembly trusses & structures, connect/interconnect of modules, airlock, heat rejection, GN&C, mechanical systems, resource integration, DMS, C&T, habitability, EVA, STS interface/berthing). This document has a continuation entitled Book 3 Ref Config Analysis (Continued)

This document(Book 4) contains sections 3, 4, & 5 of the DR-19, DP 2.1 study. Section 3 contains a discussion of the config options analysis which is to develop a SS design capable of meeting the program reqs w/acceptable risk & w/in cost targets; discussed under config options: approach/methodology, config options definition, sys analysis, subsys analysis. Section 4 contains a discussion of MTA approach; this study involves defining config by performing trades, analyses, & conceptual design activities discussed herein; also studied are comparison b/w MTA & PMC, definition of MTR-to-PMC growth factors, assessment of mission capture capability of MTA, & determination of programmatic cost of MTA SS. Section 5 deals with the results of the preliminary trade study. These 6 areas are considered: commonality, assembly sequence, growth analysis, module pattern, interface analysis, and functional allocation.

MDC-H1952

This introductory volume includes a summary of the requested major data items that are reported in detail in the remaining 4 books of the DR-19, DP 2.1 study report. Section 2 discusses the reference config analysis. Section 3 summarizes MDAC's on-going config option analysis, including their approach, methodology, & the candidates being considered from Book 4. Section 4 reports on the progress of the man-tended approach analysis, including approach, concept, & capability comparisons. Section 5 provides a discussion of prelim trade study results. Section 6 discusses tools, models, and data base definition. Section 7 gives the prelim HM & airlock outfitting reqs. Section 8 subsystem parametric analysis.

MDC-H1952

85/06/04 The CM communications subsystem is divided into audio & video subsys; the CDD is a description of these subsys. The document contains functional reqs, both explicit & derived, that apply to the audio & video subsys. The BL designs including equipment lists, weight & power reqs are provided. The trades & analyses performed for this subsys definition are identified & documented.

D483-50004-1

This DMS CDD contains the definition, function, reqs, BL design, pertinent trades & analysis, diagrams & schematics, h/w & s/w items, equipment list, specifications & drawing tree of the DMS. The document is a management tool for controlling changes to the BL config during Phase B contract. Data Management includes the data sys h/w & s/w needed to provide all SS data storage & communications for onboard users, subsys, & payloads. The following are topics addressed herein: analog, architecture, A&R, data, digital, memory, network, node, processor. DMS reqs, BL design, and trades & analyses are given.

D483-50004-7

This document defines the EPS design to date. The first four sections contain design philosophy, reqs data, results of trade studies, & the resulting BL design. The last four sections cover diagrams, schematics, & h/w specifications for the implementation of design. The following topics are considered: amperage, conditioning, energy, fault, generation, growth, override,

D483-50004-2

85/06/04 power, protection, storage, voltage.

This document defines the known S/M config of the SS CM at the time of its release. The function of the S/Ms of the CM is to contain all subsystems with an efficient arrangement & to sustain all associated loadings with adequate factors of safety. The scenarios will include ground handling loads, Shuttle keel pin & trunnion fitting loads due to launch, docking & berthing loads, pressure, thermal, & landing loads. The following topics are discussed herein: berthing, CM, fracture, keel, limit load, materials, mechanisms, reqs, rigidity, structures, trades, trunnion.

D483-50004-5

This document defines the SS propulsion subsys design as of the time of release. Propulsion sys reqs, the BL sys definition, trades & analyses studies & the propulsion sys technical description are provided. Propulsion subsys reqs, propulsion sys BL description, propulsion sys trades & analyses, propulsion sys technical description, propulsion sys specifications, propulsion sys drawing tree.

D483-50004-9

This document treats the CM Communication subsys & is divided into audio & video subsys. The Config Description Document is a description of these subsys. The document contains functional reqs, both explicit & derived, that apply to the audio & video subsys. The BL designs including equipment lists and weight & power reqs are provided. The trades & analyses performed for this subsys definition are identified & documented.

D483-50004-4

85/06/05 The objective of the reboost analysis is to determine the reqs for orbit maintenance & adjustments, and to determine the reboost strategies & procedures. The reqs include nominal altitude, operating strategy, reboost interval, reboost strategy, thrust location, reboost control strategy, & thrust level. The reqs & total impulse allocations are defined for IOC SS. The growth SS & the SP reqs & total impulse allocations are yet to be defined. The reference config, as described herein, will be used as the BL in the trades described in the reboost program plan. This plan is also attached.

D483-50004-13

This document defines the known config of the LogM portion of the SSP as of the time of release. This document will be periodically revised as the design of the LogM evolves. The document contains the following: LogM reqs: general reqs, module design reqs, reliability, safety, materials, malfunction control; logistics module BL design: BL config, concept design approach. The LogM provides SS ground-to-orbit logistics.

D483-50004-10

This section of the CDD is a stand-alone document which gives the basic reqs or BL for the TCS as set forth in the RFP. The TCS config under consideration is a low-cost, minimum-risk design concept that meets reqs. This concept was arrived at by preproposal trade studies & evaluations that considered technology readiness an important design driver & emphasized minimum sys complexity & maximum use of flight-proven h/w to evolve a minimum-cost design. The TCS consists of a single pumped-water loop, a thermal radiator, & i/f h/w for heat collection & rejection to the radiator & thermal utility bus. The following reqs are examined: general, functional, design & performance, habitability/man systems, reliability, safety, i/f reqs with heat rejection & transport sys, i/f reqs with other SS subsys.

D483-50004-3

85/06/06 The ECLSS CDD is composed of the following parts: Req: ECLSS

D483-50004-6

85/06/06 description, ECLSS Reqs for RFP, & ECLSS BL Design from RFP; Config: ECLSS Technical Description, Specifications, ECLSS Drawing Tree, references; Trades & analyses. The functions of the ECLSS include: atmospheric pressure & composition control, module temperature & humidity control, atmospheric revitalization, water management, waste management, & EVA support. The following issues are discussed: CM design, ECLSS design & trades, ECLSS closure, safe haven, non-venting of ECLSS wastes, logistics, automation & data management, maintainability/reliability, sys/subsys development, EVA equipment i/f, health maintenance.

This document contains the agenda items which were discussed at a WP-01 DR-13 Project Management Review on 6/6/85. The following topics were discussed at the review and are consequently detailed herein: conceptual design trades & analyses (including, P&VA, CM, LogM, LM); schedules (60-day look ahead, status of updating schedules); TMIS.

TSCB-36526PM26-85

This document is Appendix B Part 1 of the WP-2, DP 2.1 submittal. The document contains the following: 1) Preliminary Trade Study Results- Assembly of SSPEs (EVA timeline for Module Attachment & Installation; B Preliminary trade study results- functional allocations (function tree & hardware tree); conceptual design- integrating systems (drawings of the conceptual designs for the structure & mechanisms of the reference configuration; Manned systems (Habitat module conceptual drawings); SSIS ; EVA Systems (Airlock Internal Arrangement Drawings). The drawings referred to above are large, folded "blueprint"-type drawings, of which most of this document is constituted.

SSS85-0034

This document is the SS WP-01 Project Management Review. It contains no formal written text but instead utilizes charts, graphs, & diagrams to relay information. The following are included: SSP status summary, subcontract status, highlights of the Management Plan, TMIS information, DR-21 productivity plan status, PMR project integration, DP 1.1 architecture/format, module pattern analyses, Shuttle capabilities & impact, MTL task status, LogM, key P&VA trade studies/analyses, & DMV-SS reboost trade study.

SSP-MMC-00008

This document is volume 1 of a 7-volume WP-2 submittal which was in response to DR-19, DP 2.1. Volume 1 is divided into the following categories: Reference configuration analysis results (recommendations & WP-related data & sensitivities; Preliminary trade study results in the commonality, assembly of SSPEs, growth analysis, module pattern analysis, interface analysis, & functional analysis; preliminary definition of WP analytical tools, models, & data base; conceptual design layouts &/or approaches for WP h/w & s/w elements consisting of schematics, sketches, & brief narratives; preliminary habitat module outfitting & airlock outfitting reqs; and, subsystem parametric analysis (e.g., capability versus size, mass, cost).

SSS85-0034

This document is volume 2 of a 7-volume WP-2 submittal which was in response to DR-19, DP 2.1. This volume contains results of Preliminary Trade Study concerning the following topics: commonality, assembly of SSPEs, growth analysis, module pattern analysis, interface analysis, and functional allocations. A summary and key findings are given for these study topics.

SSS85-0034

This document which is part 2 of Appendix B of the WP-2, DP 2.1 submittal. This part of the appendix concerns itself with Manned Systems. Included are layouts & data, much of which contain drawings. Volume tabulation

SSS85-0034

85/06/06 sheets & evaluation sheets for each interior architectural concept are given. The volume sheet compares the volumes for the specific configurations being studied to the volumes for NASA's reference configuration contained in the SS Reference Configuration Description Document. Drawings reflect the radial port module which contains 4 radial ports & 2 axial ports. Dimensional drawings of the module itself are included. Commonality & secondary structure drawings are also included, with those drawings dealing with the HM and its interior. Two other alternate interior architectural concepts were studied

85/06/07 The purpose of this document is to develop an integrated approach to define, evaluate, & implement commonality in order to achieve maximum cost benefits during the SSP development & life cycle, as well as providing uniform user & crew i/f's for effective maintenance & utilization of the SS. The report itself contains detailed criteria, analysis, & design data sensitive to commonality, arriving at the selection of SS config within WP-01 & related Level B integration.

D483-50011-1

This document describes the Productivity Program for Phase B of SS WP-01. This plan establishes a formalized procedure/process that will focus attention on both human & machine productivity during Phase B of the WP-01 SS study including Phase C/D planning. The procedure will assure discipline & rigor in the entire design, development, production, & test process. It is to assure complete & accurate engineering release that was reviewed for performance, dimensions, materials, reliability, maintainability, produceability, tooling, reqs, and manufacturing process/procedures. The ultimate purpose is to reduce Class II engineering changes, scrap, rework, and repair as well as indirect burden during Phase C/D. In addition, improving the quality of all activities during Phase B will result in a significant increase in human productivity with consequent reduction in project cost.

SSP-MMC-00067

This document establishes the engineering definition of the BAC portion of the SSP BL Config. This document was structured in sections to match the design engineering teams which were assigned the responsibility for the various components of the SSP. This document is the collection of engineering design data which defines the current BL of the WP-01 portion on the SSP. The document is broken up into the following 13 sections: CM, EPS, TCS, Communication subsys, S/M, ECLSS, DMS, LM outfitting, Propulsion sys, LogM outfitting, OMV/OTV accommodations, application s/w, reboost. The purpose of this document is to establish a BL config for the SSP & to contain this BL in a single location for control purposes. This document was proclaimed to be the source of the BL config for studies & analyses. The scope is limited to the WP-01 portion of the SS.

D483-50004

This document is a MMA management plan which takes as its task to convince MSFC officials that MMA is the proper contractor for managing WP-01 activities. Seven key features of the MMA management plan are laid out in the document: Organization- MMA to establish a SSP w/ a dedicated full-time team w/ all the necessary resources & authority to complete SSP WP-01 Phase B; Subcontract Management- provide clear lines of technical & contractual direction, coordination, management, & control to assure the overall integration of subcontractor outputs into WP-01 tasks; Innovative concepts-use of innovative concepts is part of MMA study process; SE&I plan- is a balanced approach to assure a balanced SS WP-01 design, mission req capabilities, & advanced technology w/in cost constraints; Management & control- to use basic MMA

SSP-MMC-00004

85/06/07 management & control sys as tailored for ET; Implementation Plan; and Design to Cost.

This document is Volume 1 of an overall document. This volume consists of those studies & analyses that have been identified by MSFC as necessary to support the Level B EMS and which are listed in the Artemis data base as required project integration support studies. These studies are identified by the alpha-numeric IXXX. This volume also contains those studies & analyses which MMA has identified as being needed either to provide additional data in support of Level B EMS or to support the various decision items identified by MSFC as being needed to be made at RUR-1. These studies are identified by the alpha-numeric IMXX. In addition, this volume contains those studies & analyses identified by element areas other than project integration that support project integration areas of interest. These studies are identified by the alpha-numeric AXXX, MXXX, LXXX, & BXXX depending on the element area of generation.

SSP-MMC-00005

This document is volume 3 of the WP-01 DP 1.1a and consists of those DP1.1a studies & analyses that have been identified by MSFC as necessary to support Level B EMS & which are listed in the Artemis Data Base for the LogM. These studies/analyses are identified by the alpha-numeric LO12 & LO26. This volume also contains those studies & analyses which MMA has identified as being required to provide additional data in support of the Level B EMS or to support the various decision items identified by MSFC as being required to be made at RUR-1. These studies/analyses are identified by the alpha-numeric LM40 & LM41. In addition, this volume contains one study/analysis that has been identified by element areas other than LogM that support the LogM areas of interest. This study/analysis is identified by the alpha-numeric IM60.

SSP-MMC-00005

This document is Volume 4 (LogM) of DR-19, DP-1.1a. DR-19, and it is divided into 5 volumes: Integration, CM, LM, LogM, & P&VA. Volume 4 contains DR-19 data pertaining to the LogM. This document provides the prelim results of studies performed for MSFC under contract NAS8-36526 WP-01 SSP Definition & Prelim Design. The following topics are examined: Reqs: Shuttle performance capabilities & SSP implications, resource reqs, DTC, safety; Configs: architectural concepts, growth, FA; Strategies: maintainability & verification & check out.

D483-50011-4

This document is volume 4 of a set of documents which deal with RUR-1 Data Package 1.1a and consists of those studies & analyses which have been identified by MSFC as necessary to support the Level B EMS & which are listed in the Artemis Data Base as required for the M&TL outfitting Code B support studies. These studies are identified by the alpha-numeric BOXX. This volume also contains those studies & analyses which MMA has identified as being needed either to provide additional data in support of the Level B EMS or to support the various decision items identified by MSFC as being needed to be made at RUR-1. These studies are identified by the alpha-numeric BMXX. In addition, this volume contains those studies and analyses identified by element areas other than MTL that support MTL areas of interest. These studies are identified by the alpha-numeric IXXX & MXXX depending on the element area of generation.

SSP-MMC-00005

This document is volume 5A in the collection which documents RUR-1 Data Package 1.1a. Volume 5A consists of those studies & analyses that have been identified by MSFC as necessary to support the Level B EMS and which are listed in the Artemis Data Base as required for reboost analysis support studies. These

SSP-MMC-00005

85/06/07

studies are identified by the alpha-numeric AXXX. This volume also refers to those studies & analyses which MMA has identified as being needed either to provide additional data in support of Level B EMS or to support the various decision items identified by MSFC as being needed at RUR-1. These studies are identified by the alpha-numeric IMXX. Reboost, trades & analyses (structural, ECLSS, TMS, EPS, DMS, T&V), systems (logistics, commonality, crew size, ops, SR&QA, A&R, APD, contamination, sys).

This document is volume 5B of the documentation dealing with RUR-1 Data Package 1.1a. Volume 5B consists of those studies & analyses which have been identified by MSFC as necessary to support the Level B EMS & which are listed in the Artemis Data Base as required for vehicle accommodations support studies. These studies are identified by the alpha-numeric AXXX. This volume also contains those studies & analyses which MMA has identified as being needed either to provide additional data in support of the Level B EMS or to support the various decision items identified by MSFC as needed to be made at RUR-1. These studies are identified by the alpha-numeric IMXX. Sys description (propulsion I/Fs, reference config), trade studies (S/M, TMS, EPS, DMS, Communications, T&V, systems) are included in the discussion.

SSP-MMC-00005

This document is volume 5C of the documentation for RUR-1 Data Package 1.1a. Volume 5C consists of those studies & analyses that have been identified by MSFC as necessary to support the Level B EMS and which are listed in the Artemis Data Base as required for vehicle accommodation support studies. These studies are identified by the alpha-numeric AXXX. This volume also contains those studies & analyses which MMA has identified as being needed to provide either additional data in support of the Level B EMS or to support the various RUR-1 decision items identified by MSFC. These studies are identified by the alpha-numeric IMXX. Sys description (reference config, alternate config, growth recommendations), trade/analyses (S/M, EPS, DMS, Communications, T&V), Systems (logistics/maintenance, commonality, crew sys, ops, SR&QA, A&R, ADP, contamination).

SSP-MMC-00005

This document is volume 5D of the documentation of RUR-1 Data Package 1.1a and consists of those studies & analyses that have been identified by MSFC as necessary to support the Level B EMS and which are listed in the Artemis Data Base as required for fluids analysis support studies. This volume also contains those studies & analyses which MMA has identified as being needed either to provide additional data in support of the Level B EMS or to support the various decisions items identified by MSFC as being needed to be made at RUR-1. Fluid sys design reqs, fluid sys ground rules & assumptions, fluid sys analyses & trade studies, and Level B EMS.

ESP-MMC-00005

This document presents the Boeing approach to organizing, managing, & controlling the definition & prelim design phase for WP-01. It provides the MTA & PMC SS management plan in accordance with DR-01 & SOW paragraph 4.0, & includes the plan for SE&I activities in support of the NASA SE&I plan. This document also describes the BAC approach to preparing the implementation planning schedules for the follow-on design & development program in accordance with design & development phase WBS & dictionary (DR-08), design, development, & ops phase cost document (DR-09), PIP (DR-10), & SOW paragraph 3.8.

D483-50001-1

This document provides the prelim results of studies performed for MSFC WP-01 SSP Definition & Prelim Design. The data contained herein are

D483-50011-1

85/06/07

organized according to the NASA Level C EMS. This is volume 1 (Integration) of DR-19, DR-1.1a (RUR-1 minus 6 weeks). DR-19 is divided into 5 volumes: Integration, CM, LM, LogM, & P&VA. The DR-19 data are shredded into volumes to reduce the amount of data each project office is required to review. Volume 1 contains a comprehensive listing of all data submitted by DR-19, DP-1.1a. The table of contents is divided into sections to match the appropriate 19 themes in the EMS. Reqs: STS performance capabilities & SSP implications, resource reqs, DTC, customer reqs, safety. Configs: architectural concepts, growth, module pattern/size, CA, power option, FA. Strategies: commonality, maintainability, verification & check out.

This document provides the prelim results of studies performed for MSFC, & this is a data submittal (the first of 9) required by DR-19. The purpose of DR-19 is to provide progressive build up of coordinated data, leading to the prelim design of the manned or man-tended SS. The study results contained herein are intended to give MSFC visibility of interim progress & study directions. The following reqs are considered: Shuttle performance capabilities & SSP implications, resource reqs, DTC, customer reqs, safety. The following config topics are discussed: architectural concepts, growth, CA, FA. The following Strategies are discussed: A&R, maintainability, V&C.

D483-50011-3

This document treats several different growth topics which are connected with the SS CM. The following are those topics: evolutionary growth concepts, overall config issues, evaluation criteria for growth, growth overall config concepts, overall config trade data, & element growth concepts. A growth projection from IOC to FOC is also given. MTL growth needs are discussed. There is a discussion of augmented CO2 propulsion. Module pattern is discussed. Diagrams of NASA & Boeing growth reference configs are shown & their respective advantages are listed.

D483-50011-2

This is volume 2 (Common Module) of DR-19, DP-1.1a (RUR-1 minus 6 weeks), and it provides the prelim results of studies performed for NAS8-36526 WP-01 SSP Definition & Prelim Design. The following are discussed herein: Reqs (Shuttle performance capabilities & SSP implications, resource reqs, DTC, Safety); Configs (architectural concepts, growth, module pattern/size, FA); and Strategies (commonality, maintainability, verification & checkout).

D483-50011-2

This is volume 5 (Propulsion & Vehicle Accommodations) of DR-19, DR-1.1a (RUR-1 minus 6 weeks). DR-19 is divided into 5 volumes: Integration, CM, LM, LogM, & P&VA. This document provides the prelim results of studies performed for MSFC contract NAS8-36526 WP-01 of SSP Definition & Prelim Design. The data contained herein are organized according to the NASA Level C EMS. The data shown in this volume have been obtained from the trade & analyses that are being conducted in support of SS P&VA. An outline shows the data to be arranged in EMS Themes as Reqs, Configs, & Strategies. In the Reqs sections results of the Reboost Analysis Trades, DMV Performance Definition, & the Resource Reqs for all elements including in P&VA. Config section includes proposed list of options for P&VA. Assessment of VAs & Propulsion sys reference configs is given. Verification & checkout planning is included in Strategies section.

D483-50011-5

This volume (#2) consists of those DP 1.1a studies & analyses that have been identified by MSFC as necessary to support Level B EMS & which are listed in the Artemis Data Base as required for CM. These studies are identified by the alpha-numeric sequence MXXX. This volume also contains study IMOB which

SSP-MMC-00005

DATE	ABSTRACT	ID NO.
85/06/07	MMA has identified as being needed to provide additional data in support of the Level B EMS. Sys description, trades & analyses, structures/mechanisms, ECLSS, ECLSS, thermal control, electrical power, data management/communication, T&V, systems (crew sys, ops, sys reliability & quality assurance, A&R, advanced development, contamination).	
85/06/10	This document is a monthly progress report regarding Campbell Engineering's work on NAS8-36585, Rotary Joint Mechanism Test Bed Operation. A 18 June meeting was held during this period to present initial simulator concepts. Actuator and simulator were discussed, as was control dynamics.	CE8-36585 P&I
	This document was submitted in response to NAS8-36526 Change Order No. 2 (CCP-001) and is prepared in accordance with DR-21 reqs for development of a Productivity Plan for Phase B. This plan describes Boeing's approach to Productivity for SS including strategy, management structure, subcontractor flowdown, reporting, incentivization, methodology, & transition to Phase C/D. For this document productivity is defined as the business of getting more out of what is put into people, capital, materials, & energy. This plan establishes the framework for a SS Productivity Program that offers near-term Phase B benefits and will be the vehicle for significant full-scale development (Phase C/D) productivity achievement.	D483-50014-1
85/06/14	The purpose of this document is to describe the plan which is to describe the costing methodology that will be used in generating cost data for SS WP3. This report consists of 4 principal sections: 1)draft of the Costing Methodology Implementation; 2)data base identification; 3)recommend Grouping of WBS; and, 4)identification of Cost Trade-offs regarding Lab module, attached P/L Accommodation, servicing, and SP.	GE/TRW-DR19-DP3-1
	This document comprises Data Product 3.1 of the Time Phased SE&I Study Products deliverable to NASA. Its content is based on the EMS Theme outputs. This particular volume of the 7-volume set deals with Attached Payload Accommodations. The areas evaluated in the study & consequently reported in the volume are: 1)attached P/L characteristics & req; 2)P/L accommodation approaches with emphasis of determining desirable power tower configuration options for IOC & growth; 3)preliminary accommodations analysis & trades; and, 4) prelim inputs to support the Level B EMS Schedule.	GE/TRW-DR19-DP3-1
	This document contains a WBS and WBS Dictionary for each of the following under the SS DR-08: Management, SE&I, SPs, Servicing, SLM, APs, Customer Accommodations, Product Assurance, and Operations Planning.	RCA-DR08
	This document is a top level summary of Data Product 3.1 of the Time Phased SE&I Study Products deliverable to NASA. This document provides a summary of each of the volumes of the study report. The volumes covered are listed as follows: I- Laboratory Module Outfitting; II- Platforms; III- Servicing; IV- Attached Payload Accommodations; V- Design-to-Cost; VI- Systems Engineering/ Operations; VII- Customer Accommodations; and, section B of this document summarizes RUR-1 Convergence Options. Topics discussed in each summary include: size & layout, commonality, configuration, sizing, verification & checkout, costing, interfaces, P/L, growth, MTA, customer servicing, logistics, maintainability,	GE/TRW-DR19-DP3-1
	This document is an addendum to the main volume III of the WP-3 Study.	GE/TRW-DR19

85/06/14 The additional material concerns the following: The Updated Geometric and Thermal Model Definition Space Station Customer Servicing Facilities.

This document is the Design and Development Phase WBS Dictionary developed for use in Design-to-Cost activities during the Phase B portion of the SSP. This WBS is submitted in accordance with req of DR-08 specified by GSFC. The following general areas are covered under the WBS dictionary: 1)SPs; 2) customer servicing; 3)attached P/Ls; 4)work package management; 5)system engineering and integration; 6)safety, reliability, maintainability, and quality assurance; 7)operations; and, 8)SLM.

GE/TRW-DR08

This document is volume I of the 7-volume set which comprises the Data Product of the Time Phased SE&I Study Products deliverable to NASA. Its content is based on EMS theme outputs. Volume I deals with Lab Module Outfitting. This document contains the SLM contractual deliverable items & available information relating to RUR-1 data items. The following are topics covered in the document: growth; module pattern, size, & interconnections; module internal pressure; functional allocation; commonality; power tower options; and, other considerations (Design-to-Cost, logistics, maintainability, & verification test & checkout).

GE/TRW-DR19-DP3-1

This document is Volume II of the 7-volume set which comprises the Data Product of the Time Phased SE&I Study Products deliverable to NASA. Its content is based on EMS theme outputs. This volume deals with Platforms. SP functions are discussed. After a discussion of allocated criteria, subsys "mini-specs" are presented. Then a set of subsys functional descriptions & block diagrams are shown in which major subsys trades & design issues are discussed. SP configuration options are presented; there are two basic approaches (single & two degree-of-freedom SA articulation). A definition of ORU is also given in the configuration, the power option, and the maintainability sections of the document. SP resource req are summarized (weight & power data are reported). Selected sizing analyses are also given. Customer accommodations are discussed. Costing methodology relationships & approaches to assessing cost are discussed. Verification & checkout themes are also covered in the document.

GE/TRW-DR19

This document is volume III of a 7-volume set which comprises the Data Product of the Time Phased SE&I Study Products deliverable to NASA. Its content is based on the EMS theme outputs. Volume III deals specifically with the area of servicing. The following were considered in carrying out the study which is reported in the document:1)reviewing & confirming req,2)establishing & analyzing operations scenarios,3)developing options for the customer servicing facilities configurations,4)making a ROM cost estimate, and, 5)starting customer servicing subsystem design concepts.

GE/TRW-DR19-DP3-1

This document is volume VI of a 7-volume set of documents which deal with the Time Phased SE&I Study. This particular volume concerns itself with Systems Engineering/Operations. The following sections deal with the subject matter indicated: C2 addresses growth in general & specific end item growth issues, e.g. MTA; S3 presents a discussion of logistics req & identifies logistics cost drivers- serviceability of primary structures &/or propellant & pressurant tanks & plumbing, common ORU usage, & expendable stores sizing are items identified as important; S5 addresses maintainability objectives & criteria concerning A&R & SLM; and, C6 discusses trades & analyses required to define the scope & depth of verification & checkout for each end item (especially

GE/TRW-DR19-DP3-1

85/06/14 those issues unique to SPs & customer servicing).

This document is volume VII of a 7-volume report on the Time Phased SE&I Study and this particular volume deals with customer accommodations. This report is a summary of the inputs required in connections with the Customer Accommodation Task in WP-3. This volume chronicles the results of the study which had the following objectives: to ensure that the design of the System Elements that interface with the user & his mission equipment enable high mission productivity & proper performance; to define a set of evolutionary facilities for performing experimentation, development & commercial activities. Customer accommodation assessment criteria are considered, including design considerations. And accommodations are considered for each of the following: SLM, attached P/Ls, & SPs. Appendix A contains the Design Guidelines for Customer Accommodations. Appendix B contains User-Oriented Design/Operational Feature Sheets.

GE/TRW-DR19-DF3.1

85/06/15 This document is a handbook which provides uniform derivative classification interpretations for information, documentation, & ops associated with DOD STS missions. It provides NASA, the USAF, and contractor engineering & ops personnel with detailed information associated with the application of the STS Security Classification Guide. This document is to help the USAF & NSTS in providing a consistent level of security protection for DOD STS missions across all supporting STS center activities.

SS-STG-DE-CH

This document was prepared for MSFC in response to NASB-36525 in accordance with DR-14, Monthly Status Report. This is the first monthly status report. The report is organized into sections that cover the 5 WP-01 elements: Systems Engineering, CM, LogM, MTL, and P&VA. The primary activity during this period has been working with MSFC to ensure identification & coordination of all MSFC reqs to satisfy the reqs of Level B EMS. The primary effort for the next reporting period will be completing data package for DP 1.1b and supporting MSFC in preparing for RUR-1.

SSP-MMC-00006

85/06/18 This document contains materials discussed at a CMR on 6/18/85. The following were topics of discussion at the meeting: Contract status (schedule status, milestones, DR-01 status, areas of concern, WP integration, open action status); technical items (DR2.1 summary, RUR-1 Support, Level B SE&I Support); Special topics (DR-09 Cost estimate, ADP status, subcontract status-Honeywell, IBM, RCA).

WP2-CMR-8506

85/06/19 This document contains information regarding the overall assessment of work package activities. The following topics are considered: WP background; a summary of proposed candidate elements; current assessment; WP definition approach; allocation of functions; WP options (base, B-1, B-2, B-3, B-4).

MSFC-KA4-B4-VD42

This document describes WP-04 EMS Items. The first section of it describes Strategy 4 which relates to commonality; the purpose of this task is to determine the optimum application of common power sys components across the IOC SS & on the SPs. The second section of the document deals w/logistics; the strategy of logistics should include all information needed to transport, store, & handle all spares, support equipment, consumables, etc. needed to build & operate the SS & SPs thru their entire life cycle including launch & return. The info included describes a methodology of developing info rather than a listing of applicable data. The final section deals with resource reqs; this item is to

EMS-DPT-RUR1-4

85/06/19 provide the other WPs & Level B with the resources of other SS subsystems required by the Power System. This is defined as supplying them w/power sys reqs which must be met. Definitions of terms are also given.

This document is a CMR No. 1 monthly status report of RI's and subcontractor's WP-2 activities. The following items were discussed: 1)Contract Management (Schedule status, action item status, & WP integration); 2)Technical Items- DP-2.1 (Overview/configuration summary, man tended/DRM-1, power mounting, EVA system, SSIS architecture, Level B SE&I Support Tasks; and, 3)RUR-1 Special topics (RUR-1 Support Requirements/Growth Considerations, configuration management, DR-01 status, DR-09 Cost Study, AD status, & subcontractor status. Module patterns, airlocks, safe haven, power system, PV array, crew enclosure options, module lengthening, C&T, & DMS are also discussed.

SSS85-48

85/06/21 This document is part of the review material prepared for the RUR-1 meeting held at MSFC in June 1985. The following topics are considered in the discussion: Systems (configs, RM&QA, ops, safety, contamination, logistics, commonality, verification, mockup/crew system, TMIS, CA, reboost); Structures/Mechanisms; ECLSS; Thermal Control; Electrical/EGSE; DMS/Communications; Software. The end items under consideration are the Common Module, MTL Outfitting, Logistics Outfitting, Propulsion, Vehicle Accommodation, and Integration.

EL-13591

This document is to define the plan for processing the SS elements & p/l's through KSC & VAFB. This processing includes integration, test & checkout, & launch of the initial & follow-on SS elements, the return, refurbishment, maintenance, reconfiguration, & relaunch of the cyclical elements. The document provides a concept & various scenarios that will be required to accomplish SS prelaunch processing. Also defined herein is the general SS ground operations philosophy. The plan discusses overall processing req for both site activation & flight h/w elements. Documentation necessary for req & their implementation is identified & concept for ground operations team is defined. Standard launch-site operations are specified & flows & schedules for the initial, cyclical, & follow on SS elements are provided. This document describes facility & equipment req & implementation approaches, addresses customer I/Fs, safety, & security aspects, & concludes with planning for some SS contingencies.

JSC-30202

This RUR-1 document discusses the following: Systems (configs, RM&QA, ops, safety, contamination, logistics, commonality, verification, mockup/crew systems, TMIS, CA, reboost); S/MS; ECLSS; Thermal Control; Electrical/EGSE; DMS/Communications; Software. The end items under consideration in the document are: CM, MTL outfitting, logistics outfitting, propulsion, vehicle accommodation, and integration.

KA11 (85-11-100)

85/06/28 This document concern itself with the growth of an evolutionary SS. The discussion is presented as growth relates to each of the four major work elements (platforms, Life Science Lab Module, attached payloads, and customer servicing). The key issue in the trade analysis between IOC & FOC for platform resources (mass,power,heat rejection,data storage) is the over sizing to near full functional capability for commonality with core SS or optimizing SP resources modules t get maximum lift into polar orbit. Diagrams are given which illustrate the following: platform modularity & P/L carrier arrangements.

WP3-EMS-C2.3.1/.2

This document contains the documents analyzing Common Module

SS-OCS-RUR1

85/06/28 Outfitting, GSE Commonality, and Ground Verification and Checkout. See the following documents for further information, including abstracts, of each individual document: common-module outfitting -#EMS-R1.K.1; ground-processing-#EMS-S4.K.1; and, GSE commonality- #EMS-S6.K.1.

This document contains the following EMS items as points of discussion: Lab module outfitting analysis; alternate outfitting approach; WP-3 Element Characteristics for Altitude Study; resource req; microgravity req analysis; attached P/Ls req analysis; dual egress req/impact; module isolation req impact study; integration assessment; growth; module pattern analysis; internal traffic analysis; number of modules analysis; pattern recommendation; airlock; servicing feature definition; attached P/Ls accommodation definition; special accommodations definition; customer platform accommodations; field-of-view analysis; platform "EPS" commonality analysis; function listing; allocation criteria; allocation recommendation; interface recommendations; module commonality analysis; maintainability; and, verification & checkout.

WP3-EMS PROD.

This document discusses a program which is to analyze the ground processing & verification options for SSEs at KSC. Early operations analyses are needed in order to assure cost-effectiveness. Seven options have been identified which represent potential logical processing schemes. This analysis covers the after-factory processing of SSEs at KSC and involves the following areas: 1) facility site activation; 2) the flight h/w processing leading to the IOC phase; 3) the man-tended mode; 4) the turnaround (resupply) processing; and, 5) the growth phase. The 7 processing options under assessment are: 1) no powered-up ops at KSC (except LM); 2) Powered-up ops limited to on-pad; 3) integrated test but no stand-alone test; 4) integrated & stand-alone tests; 5) stand-alone test but no integrated test; 6) module outfitting at KSC, all tests; and, 7) common module final assembly & outfitting at KSC, all tests.

EMS-S6.K.1

This document discusses the RADARSAT remote sensing as handled by Canada. Requirements, including STS Performance Capability, SS operations req, resource req, design to cost, customer req, & safety are discussed. Configuration is discussed, including architectural concepts, growth, module pattern & size, customer accommodations, power option, & function allocation are discussed. Several strategies are discussed: advanced development program, automation & robotics, logistics, commonality, maintainability, verification & check-out, and international participation. Also included are RADARSAT reference configuration diagrams & specifications.

RADARSAT-RUR1

This document is a one-page document with internal traffic analysis as its subject. The objective of this EMS item is to define internal traffic in the SLM resulting from alternative module patterns and to determine the impact of module pattern on isolation requirements. The findings of this study regarding SLM can be summarized as follows: minimize traffic in the SLM; module pattern will affect internal layout due to traffic considerations; and, order of preference due to traffic conditions (pinwheel, double raft, modified racetrack, & corner cube).

WP3-EMS-C3.3.2

This document is a one-page EMS document the topic of which is an analysis of the number of modules on the SS. This particular study is to provide an input to Work Package 2 which considers a recommendation for the number of modules to be in place at IOC. It was also to consider the influences of module size, customer accommodation, growth requirements, and cost. An analysis of the

WP3-EMS-C3.3.3

85/06/28 number of modules is considered to be a task which can be done properly only after a pattern and size for the modules is narrowed to several choices. The SLM req is for dedicated space w/good access for reconfiguration and servicing. This implies a separate module for SLM regardless of the total number. The number of modules is dependent on pattern & size. The conclusion was made that a separate SLM should be maintained regardless of the total number.

This document is an EMS document as takes Pattern Recommendation for its EMS item. The objective is to provide a pattern recommendation to WP-2 based upon analyses & evaluation. The following module pattern definitions are considered in the document: pinwheel, double raft, modified racetrack, corner cube, aft cargo carrier, and modularity. The benefits of the modular approach are listed.

WP3-EMS-C3.3.4

This document is to determine the requirements for the SLM airlock. Proposals for size and location of the airlock should also be made. Also discussed are engineering analysis considerations, EVA, and ORUs.

WP3-EMS-C3.3.5

This document takes a Servicing Feature definition as its EMS item. The purpose of this task is to identify the customer use of each servicing function (resupply, assembly, refueling, checkout, ORU replacement, etc.). Also, it will define the features and range of capabilities of the service facilities. The following are servicing features which are given some attention: repair; assemble, mate, & demate; resupply consumables; deploy/retract; refurbish/clean; load transfer; orbit transfer; test & checkout; monitoring; logistics functions; and, data support.

WP3-EMS-C4.3.1

This document takes Allocation Criteria as its EMS item. The objective is to define the criteria to be used in allocating the functions defined for each of the WP-3 hardware elements: SPs (co-orbiting & polar); attached P/Ls; SLM outfitting; and on-orbit assembly, maintenance, & servicing. A candidate allocation decision should be evaluated in regard to each of the following criteria: autonomy, growth accommodation, serviceability/maintenance, failure tolerance, safety, cost/complexity, modularity of design, required level of man intervention, grouping of like functions, non-repetition of functions, relative functional aptitude, and frequency of function execution.

WP3-EMS-D6.3.2

This document takes Allocation Recommendation as its EMS item. The objective is to establish recommendations regarding division of allocations for WP-3 hardware elements: SPs (co-orbiting & polar); attached payloads; SLM outfitting; and, on-orbit assembly, maintenance, & servicing.

WP3-EMS-D6.3.3

This document takes Alternate Outfitting Approach as its EMS item. The purpose of its task is to define alternate concepts for the design & operation of the SLM which will alleviate one or more of the constraints imposed by use of the STS & maximize benefits derived from STS. Considerations include: varying size, mass, & configuration; equipment complement; on-orbit assembly & integration; launch configuration; launch full, empty, half full. Findings and rationale are also discussed.

WP3-EMS-R1.3.2

This document takes an Analysis of Lab Module Outfitting as its EMS item. The purpose of the task is to provide an analysis of constraints & benefits to SLM design & operations due to use of STS during all mission phases: launch operations, on-orbit deployment & checkout, STS crew availability, orbit

WP3-EMS-R1.3.1

85/06/28 parameters, and station buildup. The major driver, assumptions, and GSFC's position are included in the document, as are rationale, diameter considerations & length considerations.

This document takes an Analysis of Platform "EPS" Commonality as its EMS item. This EMS theme covers the study of platform commonality with the SS EPS in the areas of generation, storage, distribution, and thermal sizing. The following technologies are under consideration: energy collection (photovoltaic, solar thermal dynamic, & nuclear); energy storage (batteries, regeneration fuel cells, energy wheels, & thermal storage); and, power management & distribution (high-voltage DC & AC).

WP3-EMS-C5.3.2

This document takes an Attached Payloads Requirements Analysis as its EMS item. The purpose of this task is to develop a set of requirements to be used in the conceptual design of WP-3 end items. The specific activities required are to: identify potential core SS P/L complements by grouping & combining Langley Data Base missions by time phase; to summarize, categorize, & sort groupings of missions by resource (such as power, thermal, data, contamination, etc.); and, to define the attached P/L req in the pressurized modules as they relate to crew console stations, optical ports, p/l airlocks, commonality with servicing req, etc.

WP3-EMS-R5.3.6

This document takes Dual EGRESS Requirements/Impact for its EMS item. The purpose of this task is to define dual EGRESS requirements of SLM relative to safety and to define the impacts of providing dual EGRESS within the SLM on both configurations (module pattern, airlock placement) as well as the impacts on internal equipment (e.g., centrifuge configuration & placement). The significant impacts of dual egress are noted: 1) limitation of module pattern option; 2) difficulty of adding a single new module; 3) difficulty of isolation; and, 4) design/location of large lab equipment.

WP3-EMS-R6.3.1

This document takes Field-of-View Analysis as its EMS item. The purpose of this task is to conduct a field-of-view analysis to determine the capability of the SS to accommodate the requirements of candidate P/Ls. The study will include the relationship between the p/l's and both the reference & optional solar power collectors. Where applicable, the p/l radiant cooling field-of-view will be addressed. In this analysis, the following are to be studied: SLM, attached P/Ls, & platforms.

WP3-EMS-C5.3.1

This document takes Interface Recommendations as its EMS item. The purpose of the task is to compile recommendations regarding division of allocations for WP-3 hardware elements: SPs (co-orbiting & polar); attached P/Ls; SLM outfitting; and, on-orbit assembly, maintenance, & servicing. Three levels of interfaces were identified for ICDs: Platform Inter-work Package Interfaces; Platform Intra-work Package Interfaces; and, Platform External Interfaces.

WP3-EMS-C6.3.4

This document takes Microgravity Requirements Analysis for its EMS item. The objective of the task is to define microgravity requirements of customer & SLM equipment and to identify source & levels of disturbances. Also it is to define concepts to minimize disturbances (transient & steady state) and to evaluate impacts on SLM and customer equipment. Findings & recommendations are also included.

WP3-EMS-R5.3.5

DATE	ABSTRACT	ID NO.
85/06/28	<p>This document takes the definition of Attached Payloads Accommodation as its EMS item. The purpose of this task is to prepare a description of the customer-to-SS interface system & evaluate the degree to which customer req are accommodated. This activity consists of analyses & trade studies to evaluate the options related to structural mounts, pointing capabilities, field-of-view constraints, environmental concerns (thermal contamination, etc.), and the SS utilities (power, data handling, commands, thermal control, etc.). The document supplies guidelines for producing the attached P/L req. Customer Accommodation Assessment Criteria are provided in Appendix A.</p>	WP3-EMS-C4.3.2
	<p>This document takes the definition of Special Accommodations as its EMS item. The purpose of this task is to identify the special requirements necessary to accommodate SS customers. A listing of equipment necessary for support of life sciences, customer servicing, TDMs, & crew stations for active support of attached P/L instruments. A discussion is also given concerning Gimballed Pointing Facility Requirements.</p>	WP3-EMS-C4.3.3
	<p>This document takes the following as its EMS item: Maintainability. The purpose of this task is to identify the maintainability responsibility in the areas of defining DRUs, accessibility study, special tool requirements, maintenance analysis, fault tolerance/maintainability, and on-orbit vs. ground repair.</p>	WP3-EMS-S5.3.1-6
	<p>This document takes the following as its EMS item: Verification and Checkout. The following topics are discussed: the definition of verification which must await future clarification; a ground verification activities analysis; ground vs. on-orbit verification trades; test vs. analysis trades; protoflight vs prototype verification; growth verification approach; verification envelope definition; built-in test equipment and instrumentation analysis; ground checkout requirements analysis; and, ground vs. on-orbit checkout trades.</p>	WP3-EMS-S6.3
	<p>This document takes the following for its EMS item: Module Commonality Analysis. The purpose of this task is to provide analysis results to WP-1 of common module requirements, configuration, resources, and resource distribution. The document includes a table which gives a preliminary list of commonality candidates combined with the rationale for commonality and the information required before an adequate commonality analysis can be conducted.</p>	WP3-EMS-S4.3.1
	<p>This document takes the Module Isolation Requirements Impact Study as its EMS item. The purpose of this task is to determine the impacts of requiring module isolation and the degree of isolation necessary, to consider crew safety & health as first requirements, and to evaluate contamination control/isolation techniques for threatening situations, e.g., bacteria contamination. The significant impacts of isolation requirement are outlined in the document as: 1) design of hatches & utilities for complete isolation w/o affecting the rest of the SS; 2) design of 3-level containment for any health- or life-threatening substance; and, 3) definition of the need for crew decontamination or isolation procedure to enter/exit from any SS area on a regular basis.</p>	WP3-EMS-R6.3.2
	<p>This document takes WP-3 Element Characteristics for Altitude Study as its EMS item. The objective of this task is to establish an element characterization for Operating Altitude Study, to provide rough outlines & mass properties of estimated WP-3 hardware externally on SS for drag, reboost, & ACS</p>	WP3-EMS-R1.3.5

85/06/28 analysis, and to develop preliminary approaches of launch groupings & identify STS carrier supports. Also to be covered in this task: prelim outline drawings of interfacing support sys b/w SS structure & the user/instrument interface; prelim distribution layout of the interface sys about the SS; prelim mass properties; all of the above include the cross sections & mass properties of typical users/instruments; STS/SS interaction & interface req; and, overall sys configuration trades. Study findings concerning the following are given: SPs, SLM, & attached P/Ls.

This documents takes Customer Platform Accommodations as its EMS item. The purpose of this task is the definition of platform accommodations available at the SS. The efforts of contractors in studying these concerns are discussed.

WP3-EMS-C4.7.4

This EMS document was designed to evaluate the impact of alternative module patterns on the SLM and to propose acceptable patterns. Also it was to consider airlock placement, traffic, isolation (mechanical & biological) growth, and resource distribution. Consideration was recommended for the following during the study: module length, isolation (material isolation, bioisolation, & proprietary equipment), module layout orientation, module pattern, growth, and variable gravity centrifuge inclusion. Discriminators & options are also discussed for outboard geometry (module congruity, module connectivity, field-of-view), port configuration (axial ports, radial port locations, number of radial ports), and interconnect module.

WP3-EMS-C3.3.1

85/06/29 This document is a plan the purpose of which is to define NASA & contractor actions that will implement A&R in the SS. This plan does not add work to the SOW of the SSP Phase B RFPs; rather, this plan interprets the intent of the RFP for A&R & makes explicit the RFP references to the NASA Advanced Technology Advisory Committee. Recommendations are made concerning the use of A&R in the SS. Both the Technical and Management Approaches are considered in the document.

JSC-30204

This document was produced in support of the Level B SSPD as a delegated SE&I task & forms a portion of the External Thermal Environment Data Base maintained by Level B. In particular, this document describes the GMM's & data generated by JSC Structures & Thermal Division for use in the initial SS power tower reference configuration ETEDB definition. The TRASYS computer program was used for defining the power tower reference configuration integrated thermal radiation environment for beta angles of 0 & 52 degrees. The TRASYS & a full set of data are described. File description & format are also described.

JSC-30205

85/06/30 This document is a USRA progress report for the period from 5/29/85 thru 6/30/85. The major events which transpired during this reporting period includes the description of the work done by Dr. Douglas ReVelle, who was a USRA visiting scientist in the Space Sciences Division engaged in research related to the neutral upper atmosphere. Also discussed for this reporting period was a June 20-22 workshop at which current scientific issues in large-scale atmospheric dynamics were discussed.

USRA8-36400 PR1

This report describes the work performed through 30 June 1985 and forecasted for the next month with indication of current problems and proposed corrective action. Progress during this month included: contract and administrative tasks being initiated to create a definitive contract and set up internal project orders authorized; design efforts were begun; technical review

BENDIXB-36628 FR1

DATE	ABSTRACT	ID NO.
85/06/30	took place 25-26 June at MSFC. Forecasted work included: initiate documentation of required trade studies and start prelim design activities in preparation for Preliminary Design Review scheduled for November 1985.	
85/07/01	This document is a monthly progress report for July 1985 which discusses a number of agreements which influenced the scope & content of the ARBC study. The document contains information which is to document those agreements the agreement & other aspects of discussions which may have been useful for future reference. A primary goal of the study was to investigate design techniques for the overall attitude control of the SS using CMGs. Reboost mode is discussed. Structural Vibration of modes such as Mode 38 were discussed. FACC computer software & its uses at MSFC were discussed.	FACCB-36422 PR2
	This document is a monthly progress report for June 1985, and it is to provide NASA with visibility on project performance, status, problems, & accomplishments by MDTSCD. The document is to provide the following: a quantitative description of work performed during the work period; a summary of work planned for the next reporting period; a summary of problems & concerns; and, a summary of manpower expended in the current month, cumulative manpower expenditures to date, estimate of physical completion of contract, & explanation of significant variances.	ECLS R0002
	This document is the eighth bi-monthly progress report for the RI study of GTA. The document discusses the schedule delay which caused a holdup in the completion of the test article assembly & checkout. Additional costs, on-site demonstration, and planned work are considered in the document, as are problem areas and a financial summary.	RICB-34657 BMR8
	This report summarizes the work accomplished under the Integrated Wall Design and Penetration Damage Control study during the month of June 1985. The objectives of this contract are: 1) to develop an integrated module wall design for the Common Module that will meet requirements for internal pressure, launch and berthing loads, meteoroid and space debris environment and thermal radiators and 2) to develop a penetration control plan to assess the effects of primary wall penetration and for module repair/replacement following impact. Reported during this period were: an orientation meeting held at MSFC on 7 June 1985; began the compilation of the design database; and an evaluation of penetration prediction analyses was made.	BACB-36426 PR1
	This TM compares the SS 9-foot single-fold deployable truss, 15-foot erectable truss, & the 10-foot double fold tetrahedral truss. The results of a trade study on truss structures are presented. The following general topics are addressed: CA, subsys integration, construction ops, cost analysis, & truss criteria.	NASA TM-87573
85/07/02	This document delineates the BAC management organization for execution of the ADP, provides a detailed description & schedule for each of the 11 Advanced Development tasks, & describes complimentary company funded IR&D for informational purposes. This plan describes those tasks believed to be necessary to support NASA in advancing the goals of WP-01 design for IOC SS. It provides early data for definition trade studies. This plan defines 11 tasks; its major thrust is to develop component technologies that lead toward subsys buildups & generates data in NASA testbeds.	D483-50002-1

DATE	ABSTRACT	ID NO.
85/07/02	<p>This document is composed of a letter & enclosures. The letter is from Clarke Covington at JSC with distribution going to individuals at various NASA centers, one of whom was L. Powell/MSFC. The letter defines the WP-2 data requests to Level B. The 2 EMS items involved are summarized as follows: R2.2.1- Provide requests to other WPs & collect reqs for EVA, assembly, internal operations, orbital dynamics, prox ops, & flight support; R3.2.1- Provide requests to other WPs & collect reqs for thermal, data, EVA/IVA, C&T, & crew task reqs. Enclosure 1 requests reqs associated w/EVA, assembly, internal operations, orbital dynamics, prox ops, & flight support. Enclosure 2 requests resource reqs associated w/thermal, data, EVA/IVA, C&T, & crew tasks.</p> <p>This document is composed of an introductory letter & 4 accompanying enclosures. The letter was from Clarke Covington at JSC & was sent to various NASA personnel at various centers, one of whom was L. Powell/MSFC. Enclosure 1 lists each Level B EMS milestone currently (in 7/85) due from WP-2 with references where the data supporting the milestone can be found in the DP 2.1 DPs. Where appropriate, the primary data was indicated in support of the milestones. Data in support of items S3, S6, & C4, which were not part of DP 2.1, are provided in enclosures 2, 3, & 4.</p>	<p>KC2-85L-52</p> <p>KC2-85L-50</p>
85/07/06	<p>This document is a plan for conducting a study to determine the possibilities of a MTA SS, prior to the PMC SS. This study is to be conducted in response to a congressional request which was made in light of possible budget restraints on the development of a SS. This documents gives the following as part of a plan designed to study the MTA SS: guidelines & assumptions for the study; technical approach, including strategy & tasks; management approach, including responsibilities, responsible personnel, the schedule, and a listing of deliverables (initial documentation, WP Data, & a report). Also included are milestone charts covering the length of the study.</p> <p>This document was produced as a result of a congressional mandate which demanded an examination of an MTA SS as a means of evolving into a PMC SS. Possible use of MTA SS, instead of initial PMC, is based on budgetary restraints. This document provides a reference MTA configuration for the Phase B system definition studies as described in the MTA management plan. This document provides a reference configuration which is to be a common datum for the studies. The following types of information are provided in the document as part of a plan for the study: guidelines & assumptions; reference system description, including configuration & subsystems; & a discussion of user support. Diagrams of the MTA reference configuration are provided.</p>	<p>JSC-30210</p> <p>JSC-03211</p>
85/07/08	<p>This document is a monthly progress report for work performed during June 1985 on the Space Station Structures Development. Work on the subject contract began 6/1/85 & was to continue through 9/30/87. During June '85, 2 significant efforts were undertaken. First, the Program Plan was presented to MSFC personnel during the Orientation Briefing on 6/11. Second, following approval of that Program Plan, work was started on all three tasks constituting the contract. The 3 tasks are as follow: Alternate Deployment Systems for Linear Truss, Advanced Composites Deployable Truss Development, and Assembly of Structures in Space/Erectable Structures. Progress in these three areas is outlined. Plans for July and a financial summary were also given.</p> <p>This document is the June 1985 LMSC monthly progress report for work accomplished on the SS Trace Contaminant Load Model, SS Contaminant Control</p>	<p>RICB-36421 MF1</p> <p>LMSC/D962195</p>

DATE	ABSTRACT	ID NO.
85/07/08	Analysis Computer Program, and on SS cleanliness. A prelim SS contaminant load model was completed. A literature search was begun to help with load estimation & candidate techniques identification & analysis. Work was begun on SS Contaminant Control Analysis computer program. Work planned for the next reporting period is also discussed.	
85/07/09	This document is a RUR1 document produced by the Canadians and discusses the following topics: Space Construction & Servicing Concepts; ISTF; ISTF Location Issues; and Open Items. SCSC concepts & architecture are discussed. Elements, concepts, & architecture ISTF are discussed. Concepts, architecture, and configurations for location of ISTF are discussed. This document also contains a copy of Space Station Program RUR1 Data Products for the Canadian ISTF (see Document # ISTF-RUR1).	SS-RUR1-090
85/07/10	This document is a progress report on the activities regarding the Space Station Body Mounted Radiator Systems study. During this activity period, environment analysis was completed using an updated Space Station model which included the truss structure. An effort was initiated on thermal models of two configurations of Body Mounted Radiators (BMR). A program schedule and engineering working hours for Voughts BMR efforts are given.	3-14000/5R-2
85/07/11	This document is a progress report of activities of the SS PLIMP and Contamination study for the month of June 1985. The objective of this effort was to develop an improved set of plume/plume impingement codes which will advance the state of the art and improve the accuracy of calculated plume-induced design environments for the SS. The RAMP2F, BLIMPJ, & CECR2F codes were converted to VAX-11 FORTRAN and were installed on the LMSC & MSFC VAX 11/780 computers. Contour plot code was being converted from Univac to the VAX; modifications were being made to allow plotting of contour lines. Future work and a financial report were also provided.	LMSC-F042511
85/07/12	This document contains data submittals for June 1985 and these include the following: (DR-09) Design, Development, & Operations Phase Cost Document/ POP 85-2; (DR-13) PMR; (DR-01) Management Plan; (DR-19) RUR-1 Data Package 1.1a; (DR-21) Productivity Plan for Phase B; (DR-14) Monthly Status Report; & (DR-19) RUR-1 Data Package 1.1b. The following are also discussed in the document: subcontract status, TMIS, key technical/management issue, micro-g level issues, modules, SS assembly using OMV, dual egress alternatives, commonality, CM, BMR, ECLSS, MTL, logistics, propulsion, VA, OMV, DTV.	ESP-MMC-0010
	This document was produced to accompany a Boeing Space Station Project Management Review (PMR). It includes information regarding the subjects discussed at the PMR. The following topics were on the agenda: productivity, conceptual design trades and analysis (integration, propulsion and vehicle accommodations, Common Module, Logistics Module, Lab Module). The following were listed as activities engaged in during June 1985: continued engineering studies; supported updates to Phase C/D work breakdown structure and pricing; implemented Advanced Development tasks in accordance with approved plans. Concerns and issues during this period included Engineering Master Schedule process, Shuttle payloads, dual egress requirements, and the electric power budget.	BACB-36526FMR
85/07/15	This document is a LMSC monthly progress report for June 1985 and it deals with Thermal Storage/Refrigeration System Research and Development. Thermal storage reqs are summarized; this table includes the SS Central Thermal	LMSC-F042512

DATE	ABSTRACT	ID NO.
85/07/15	Bus & Power Module, it was decided by MSFC that efforts under this contract be directed to Module Thermal Storage only. Also reported on is the evaluation of the thermal storage concept of encapsulating NH3 in small metal capsules.	LMSC-F042518
	This document is a monthly report of Boeing activity relative to NAS8-36526 for June 1985. This report is organized by module and functional manager. The following were some of the activities engaged in during the period: Boeing was in a Project Management Review at MSFC; support was given on EVA system design requirements study mid-term review; support was given on DR-19 synthesisization in preparation for RUR-1; support was given in making updates to the Phase C/D WBS and pricing. Integration, Common Module, Lab Module, Logistics Module, program control, manufacturing and quality assurance, and business management are also considered in the document.	2-8291-0000-03A
	This is the second Monthly Status Report submitted in accordance with the reqs of DR-14. The period of time covered by this report is 6/1/85 through 6/30/85. The primary activity during this period was the completion and submittal of Data Packages 1.1a and 1.1b. Also, support was provided to MSFC in their preparation of RUR-1 which was to occur in July. The first monthly Progress Review was held at MSFC during this reporting period. The primary effort for the next reporting period was to be the preparation of data for the RUR-2 data packages and the assimilation of feedback from RUR-1 into these data. CM, LogM, MTL, P&VA, ADP, flight ops, & productivity were discussed.	SSP-MMC-00006
	This report covers topics discussed during a telephone conversation between A. Ray and J. Randolph on 11 July. The topics discussed during the phone call, and consequently addressed in this document, regard topics related to the Electro-Optical Sensor Assembly. Three activities were discussed: electronics piece part procurement was initiated, a preliminary layout of the base plate was completed, and the lens specification was started. Enclosed is the revised schedule for the program which takes into account funding constraints of MSFC. Cost information required for progress payments are included.	84SDB-36627 P01
85/07/16	This document presents the Boeing approach to organizing, managing, & controlling the definition & prelim design phase for WP-01. It provides the MTA & PMC SS management plan in accordance with DR-01 & SOW paragraph 4.0, & includes the plan for SE&I activities in support of the NASA SE&I plan. This document also describes the BAC approach to preparing the implementation planning schedules for the follow-on design & development phase WBS & dictionary (DR-08), design, development, and ops phase cost document (DR-09), PIP (DR-10), & SOW paragraph 3.8.	9483-50001-1
85/07/18	This document is a MSFC RUR-1 product which discusses integration. The following topics are discussed as part of the integration: STS Performance Capabilities; Configs (options, growth, module pattern, airlock location, & function allocation); RM&QA; Ops; Safety; Logistics; Commonality; Verification; Crew Systems; TMIS; A&R; Resource Reqs; Software; Major Issues & Concerns (NSTS Performance, Safe Haven, 10-6 g, dual egress, airlock location).	MSFC-RUR-1-197
	This first monthly progress report presents a description of program activities at UT-HS during the period from 5/20-7/1/85 in performing the SS LLFS program. The basic objectives of the program are to evaluate the complex issues	H8B-36626 MFR1

85/07/18 associated with SS LLFS, generate workable design configs which satisfy LLFS reqs, & manufacture test h/w suitable for evaluating & demonstrating maintenance technologies. The following were accomplished during this period: initiated definition of critical maintenance functions; completed ROP. A definition of the critical maintenance function is given.

85/07/19 This document contains appendices for DR-19 DP-4.2 of WP-04. This is the Solar Dynamics (SD) Appendix. These are discussed herein: SD-1) Computer Codes for SD Analyses; SD-2) Concentrator Subsystem (Optical Configuration Trade, Deployable & Erectable Concentrator Designs, Materials Evaluation Trades); SD-3) Engine/Alternator Subsystem (Engine Bearing/Seal Assessment, Preliminary Screening of Generator Concepts, Parasitic Regulator Comparisons); and SD-4) SD Thermal Control Subsystem.

45300.101-001

This document contains specifications which establish the preliminary requirements for the Electrical Power System (EPS), which is a principal portion of the Space Station Program. These requirements have been derived from Attachments C-2, C-3, and C-4 of the NASA Request for Proposal Statement of Work for the Space Station Program. This document is to be continuously revised. The requirements of this document are applicable to the Space Station and Space Platform portion of the Program. They apply equally to the manned initial, the man-tended initial, and growth Space Platforms (both polar orbiting and co-orbiting). The document is divided into the following five sections: requirements; tools, models, and data base definition update; system trades backup data; supporting data for interface analyses; and on-orbit assembly detailed procedures.

45300.101-001

This document contains the Japanese Technical Coordination Sheets submitted as part of the Japanese RUR-1 drop on July 19. The technical sheets cover the following: system performance; operational req (operational envelope, environments design, dynamic interaction); resources; architecture- module pattern; growth- criteria for accommodating growth; logistics; verification; standardization/commonality; power options; functional allocation; safety; automation/autonomy; berthing/docking; electrical power interface; communication & control interface; environmental control interface; thermal control interface; on-orbit operations; mission operation; crew related activities.

SU-285010A

This document is a set of appendices for the data submittal DR-19 DP-4.2 of WP-04. The appendices included herein treat the following topics: A1) Solar Array Performance/Cost Substantiation; A2) Solar Array Shadowing Analysis; A3) Energy Balance Computations; A4) Erectable Rigid Panel Design; B1) Regenerative Fuel Cells; B2) Fuel Cells; B3) Battery Parametric Data; C1) High Frequency AC; C2) 400 Hz System Design; C3) Preliminary PMAD Composite Data Base; D1) Thermal Control.

45300.101-001

This document is Book 2 of a 4-book set which treats DR-19, DP-4.2 of WP-04. It treats sections 3 and 4 of the complete document. Section 3 presents results of a number of parametric analysis runs of the Systems Level Engineering and Design of Spacecraft program. These first runs have used preliminary performance, weight, and cost data base information which will improve in quality and accuracy as Phase 2 continues. The runs which have been made provide gross cost-comparative data on regenerative fuel cell (RFC) versus NiCd batteries; RFC channel size effects; solar dynamic power module size comparison; solar dynamics versus photovoltaic comparisons; and orbital replacement unit

45300.101-001

85/07/19 versus HTB comparisons. Section 4 summarizes subsystem-level trades and analyses on solar dynamics, photovoltaic, and power management and distribution (PMAD) elements and subsystems. Parametric data are provided on a number of options.

This document is Book 3 of a 4-book set which deals with DR-19, DR-4.2 of WP-04. This book covers Sections 5 and 6 of the overall document. Section 5 contains requirements and assumptions on the functions, performance, and interfaces of the Electrical Power System (EPS). A category of interface specifications entitled "resources" is included in Section 5.3. Section 6 presents the results of 15 specific system-level trades. These trades cover Space Station and Space Platform sizing, growth scenarios, loads/structures requirements, controls/pointing requirements, customer accommodations and interfaces, commonality, maintainability/servicing, test and verification, autonomy and automation, launch and on-orbit assembly, shadowing and viewing interference, functional allocations, safety and failure effects, and solar dynamic versus photovoltaic comparisons.

45300.101-001

This document is book 6 of an 8-book document which contains EMS theme outputs deliverable to GSFC. This book concerns Operations Planning and Costs and contains 4 sections which contain the derived operations requirements for the 4 end-items of WP-3, as they impact the end-items of Work Packages 1&2. Each of the WP-3 end-items have been evaluated for operational concerns & preliminary req are identified and categorized by Work Package. Operation support req are given for the SLM, platforms, servicing, and attached P/Ls. Estimates are given for annual operations costs for the year 1996 are given, as are accompanying assumptions.

GEEMS-RUR100

This document is book 8 of an 8-book document which contains EMS Theme outputs deliverable to GSFC and it deals with the subject of A&R. The details contained herein define candidates for SS, select candidates for IOC, and define SCAR for growth. This report addresses A&R in the areas of: SLM, attached P/L, service, & platforms. The safety of SS personnel & equipment, productivity, & cost effectiveness of overall operation is a subject discussed. Commonality of A&R hardware/software characteristics are shown to be very desirable in order to affect time & cost levels of research, development, design, manufacturing, & test prior to IOC and reliability, maintainability, training, & operational integrity after IOC.

GEEMS-RUR100

This document is the data submission, DP-4.2, of DR-19, the "Time-Phased SE&I Study Products." Book 1 includes an introduction in Section 1 and a discussion of End-to-End Architecture in Section 2. Four descriptions of preliminary end-to-end reference case architectures are provided in some detail in Section 2. Initial Operating Capability versions of the photovoltaic, solar dynamic organic Rankine cycle, solar dynamic high-temperature Brayton cycle, and of Space Platform photovoltaic are given. Summary descriptions, configuration drawings, block diagrams, size and weight data, equipment lists, resource requirements, costs, and subsystem descriptions are also given.

45300.101-001

This is addendum number one to book 5 of an 8-book document which contains EMS Theme outputs deliverable to GSFC. This book deals with SE&I. It gives information concerning Advanced Development Recommendations: Merge NASA & Contractor ADPs and Analyze AD for IOC Application & Selection. Recommendations and concerns are expressed for each of these actions.

GEEMS-RUR100

- 85/07/19 This is book 1 of an 8-book document which contains EMS Theme outputs deliverable to GSFC. The topic of this book is Lab Module Outfitting. It is organized in 10 sections consistent with the top level EMS categories outlined as follows: R1- SS Operating Requirements; R4- Design to Cost; R5- Customer Req; R6- Safety; Q3- Module Pattern/Size; S1- ADP; S2- A&R; S4- Commonality; S5- Maintainability; and, S7- International Participation. Some of the subtopics include: R4- DDT&E, animal operations, costing; R5- life science req; R6- dual egress req, module isolation req, emergency definition & containment, safety issues; Q3- airlock location; S1- IOC application; S2- definition of candidates & selection criteria, definition of SCAR for growth; S4- methodology definition, module outfitting, GSE commonality.
- This is book 2 of an 8-book document which contains EMS Theme outputs deliverable to GSFC. This book deals with Platforms. The document is divided according to the following: STS Performance Capability & SSP Implications; SS Operations Req; Resource Req; Design-to-Cost; and, Customer Req. Some of the information given includes that of the following: 1) show impact of STS performance limits on SP sizing analysis; 2) provide operations req to other WPs & Level 2; 3) compile time phase & analyses resource req for SP; 4) draw up DDT&E Cost Estimate (in IOC & growth) and annual operations cost estimates; and, 5) list customer resource req for SPs and SP req, excluding resources. Configuration issues, such as growth, module pattern/size, power options, & function allocation are examined. A&R & scarring for growth are considered, as is the subject of commonality.
- This is book 3 of an 8-book document which contains EMS Theme outputs deliverable to GSFC. It concerns Customer Servicing and includes the following information: operational requirements for support in customer servicing activities by SS elements. Rough estimates of annual customer service operating costs were derived on the basis of specific assumptions for a typical year of no growth after IOC, including assumptions on spares req, maintenance & repair, storage on orbit & on the ground, transportation to & from orbit, training & other peripheral items. A determination is made concerning annual power, heat, transfer & fluid resupply needs, and of crew activities in the IVA & EVA categories. Initial analyses of safety issues & req were performed. The document defines servicing A&R candidate selection, preferred candidates for implementation at IOC, and "Scars" for A&R technology growth in servicing.
- This is book 5 of an 8-book document which contains EMS Theme outputs deliverable to GSFC. It concerns SE&I. This document covers the following main topics & subtopics: R5- Customer Requirements (Customer Resource Req, Lab Module Resource Req, Attached P/L Req, & Summary of "Tall Pole" Req); R6- Safety (Critical Function Caution & Warning); S1- ADP (Merge NASA & Contractor ADPs and Analyze AD for IOC Application & Selection); and, S4- Commonality (Methodology Definition, Module Outfitting/Systems Commonality Analysis, Definition of Functional Commonality Candidates, and GSE Commonality). Also, MTA is discussed.
- This is book 7 of an 8-book document which contains EMS theme outputs deliverable to GSFC. This particular book deals with the SSIS. This document contains the first input of the deliverables negotiated for the SSIS. It consists of 4 EMS themes: R3- Provide SSIS Resource Req to other WPs; C6- function listing; C6- Allocation Criteria; and, C1- SSIS Architectural Assessment. R3 derives & analyzes the performance requirements, C6 the functional requirements, and C1 the architectural considerations. Taken together

GEEMS-RUR1E

GEEMS-RUR1FL

GEEMS-RUR1SV

GEEMS-RUR1SE

GEEMS-RUR1S

DATE	ABSTRACT	ID NO.
85/07/19	they provide a comprehensive preliminary overview of the SSIS. The discussion of SSIS is divided into the following major areas: 1)On-board SSIS, 2)C&T, 3)Ground SSIS, 4)Software, 5)Special Emphasis Areas, 6)Customer Servicing, 7)Platforms, and 8)Preliminary Assessment.	
	This particular document is book 4 of an 8-book document which contains EMS Theme outputs deliverable to GSFC. This book concerns itself with AP Accommodations. Included are the mass properties of the 4 payload groupings which were developed under data package DP-3.1. A complete package of IOC P/Ls is included & will be used as the basis for future conceptual support development & P/L accommodation assessments. The document contains the following headings: R1- STS Performance Capability & SSP Implications; R2- SS Operation Req; R4- Design-to-Cost; R6- Safety; S1- Advanced Technology; S2- A&R Req; S4- Commonality.	GEEMS-RUR1A2
85/07/20	This initial report covers the first work interval of the Advanced Planar Array Development. The work interval for this report covers 15 May thru 30 June 1985. The following was work accomplished during this reporting period: initial blanket design task was focused to support the h/w design & fabrication required for Task 2.0; assignment of key personnel to insure completion of each major test effort (the names of the individuals are given); Task involves panel fabrication & testing. Current problems regarding manpower, material costs, and MSFC management were outlined.	LMSC-D973457
85/07/22	The following is a progress report for June 1985 regarding HAC work on the MADDS. The following work was performed during the period: internal task effort was initiated for the tradeoff study of Infrared (IR), millimeter wave and Radio Frequency technology applicable to the SS for wireless communications and review/revision of the program study plan was put into process. Current problems, work to be done in next reporting period, and cost information are also included.	HACB-36430 PR1
		HACB-36430 PR1
85/07/25	This document contains lists which give the functions of the following individuals: principal investigator (PI); payload element developer (PED); payload mission manager (PM); STS payload integration manager; SS payload integration manager; carrier element manager; and, launch site support manager.	OCJB-36404 7-85/1
	This document is a blank Management Philosophy Checklist. See OCJB-36404 7-85/2 for details about the Checklist.	OCJB-36404 7-85/2
	This document is a function list obtained from MDAC. The document is concerned with Platforms, Attached Payloads, Science Laboratory Module Outfitting, and On-orbit Maintenance, Assembly, & Servicing. Additions to the list are noted with a "2" after the function. Also included are expansions of functions which will be added to appropriate sections within the MDAC outline for SSDS functions.	EMS C6.3.1
	This document is a quarterly report from OCJA regarding User Ops Management. The analyses & other tasks accomplished during this reporting period are: identified functions performed by Spacelab & Spacelab p/l organization; identified SSP features that might influence the functions identified for similar SSP organizations & develop an analysis form for SSP functions changes;	OCJB-36404 7-85

85/07/25 analyzed functions against the drivers to determine necessary changes of functional responsibility for SSP; and, develop a "Strawman" SS P/L Management Plan. See attachments #1-4 to this document.

This document was prepared to explain to prospective experimenters established reqs, events, & schedules for the SSP. On the SSP P/L Missions which are conducted to benefit multiple investigations, a joint effort is required among the PIs, the PEDs, the P/L Mission Manager, and the various SSP Element & Integration Managers. The goal of this team is to obtain the maximum return (science or products) with minimum expenditures. This document has been prepared to aid in the attainment of this goal. The reqs or controls discussed are to assure that each user realizes his own objectives w/o interfering w/other users or endangering SS/crew. This document is applicable to all p/l's to be operated in conjunction with SSP. This is the source document for all reqs to be levied on a PI &/or a PED, and it defines the interfacing methods for them.

DCJB-36404 7-85/4

This is a collection of Management Philosophy Checklists. Each checklist concerns itself with a particular Organizational Element (PI, PED, PMM, STS PIM, launch site support manager, carrier elements). SSP features, P/L location, P/L type, P/L integration, longer mission, on-orbit maintenance, flight crew rotation, detail cap on-board, logistics support, multiple IPLs for resources, minimum functions for STS, are also considered as to whether or not functions require changing. If changes are required, the nature of those changes is given.

DCJB-36404 7-85/3

85/07/26 This document contains data regarding the SS Common Module. It is divided among the following categories: Req's resulting from RUR-1; CM config; Subsys Descriptions (electrical subsys, DMS, communications subsys, ECLSS, TCS, S&M); Trades & analyses; Issues & Concerns.

SS-RP-100

This document contains data which represent the RUR-1 end item book for the MTL. The purpose of this document is to present the overall status of the MTL definition at the completion of RUR-1 review activities. The data herein reflect a synthesis of the MTL tasks, trades, & analyses that have been performed by the 2 Phase B contractors & by MSFC S&E personnel. The document consists of 7 major sections or paragraphs. Paragraph 2.0 addresses MTL req's; particular attention is given to those req's that are believed to be the most significant MTL design drivers. Sections 3 & 4 present overviews of the MTL config & subsys. Summaries of MTL trades & analyses are given in Section 5. Trades & analyses applicable to CA are shown separately in Paragraph 6. The major MTL issues & concerns are identified in Section 7.

SS-RP-200

This document contains the preliminary SS Information System req to be used as input to WP1 Common Module activities and WP2 SSIS Architecture, DMS, C&T, and SDE activities. Section 2.0 baselines the customer req. Sections 2.1 & 2.2 describe the on-board SSIS req. Section 2.3 describes the ground SSIS req. Section 3.0 discusses preliminary nature of the servicing SSIS req & presents the future plans for definitization of these req. Section 4.0 provides a view of the Platform unique req on the SSIS.

EMS R3.3.1

This document describes the JEM Reference Configuration. The document covers the following topics: 1) reference configuration (two-dimensional drawings, config description, design req, sys-subsy interface req, & mass properties); 2) operations (preferred attached location to SS, viewing req, manipulator ops/

SU-285018

85/07/26 req, PA, servicing req, CA, crew accommodations/safety; and, 3) participation option in growth- free-flyer (general arrangement, flight modes, servicing req, & mass properties).

This document is a data package containing data regarding the following WP-2 EMS themes: (R1) STS performance capability/integration; (R3) Integrated Resource Reqs; (R5) Customer Reqs; (R6) Safety; (S2) A&R; (C1) Architectural concepts; (C2) Configuration 2 growth; (C3) Module Pattern/size; & Commonality.

WP2-EMS-DF

This document is entitled, "SS Vehicle Accommodations Data Book." The following are discussed in the document: Ground Rules & Assumptions (Mission Model Data & Scenarios OMV/OTV); OMV Description & Performance Definition; OTV Description & Performance Definition; Reference Reqs (Resources, Fluids, Ops, Growth, Interface Reqs [OMV/SS, OMVA/STS, OTVA/SS, OTVA/STS], Safety); Vehicle Accommodations Concepts (OMV & OTV); Mission Kits/OMV; A&R; List of Trade Studies; Issues & Concerns.

SS-RP-400

This document is intended to provide a reference config & associated data for the SS LogM, including reqs, config, issues, & concerns. The enclosed information represents only the MSFC S&E position at RUR-1 & is not intended to identify any SSP decisions or positions. Key reqs for LogM are identified. LogM subsys description is also given herein. A report is made concerning LM trades & analyses. An evaluation is made re universal vs mission peculiar config. Also discussed in the trade pressurized/unpressurized LogM. LogM location options are treated. LogM unpressurized structure- sensitivity analysis is given herein. Tankage reqs are considered. CA as they relate to the LogM are also discussed.

SS-RP-300

This document is to provide a definition of the reqs for processing SS p/l's through KSC and VAFB for pre-launch & post-landing ops. These reqs will be based on analysis of the current SS architecture, the Mission Database, and the current ops philosophy. This is the draft release and does not include any final results but is intended to demonstrate the approach & direction the mature analyses will take. The scope of this document, in the initial draft release, is limited to the definition of facility reqs; the scope will be expanded in future releases.

EMS-CGPA-R5.K.1

This document treats the subject of the propulsion subsystem which is required to perform the altitude maintenance function & certain attitude control maneuvers. The propulsion reqs fall into 2 major categories: those that can be done only by the propulsion subsys and those in which the propulsion subsys operates in the event that another subsys fails & a backup capability is required. GN&C reqs are also discussed, as are the operational reqs. System reqs & safety reqs are also discussed. IOC config propulsion sys mass locations are also discussed. The Centralized Monopropellant Hydrazine System Reference Config is also given. H/W reqs & weights are given. Propulsion sys trade studies & analyses are given. IOC SS 90-day Reboost Impulse Reqs are also given.

SS-RP-700

This large document discusses the following general topics: STS Performance Capabilities; Configs (Options, Growth, Module Pattern, Airlock Location, Function Allocation); RM&QA; Ops; Safety; Logistics; Commonality; Verification; Crew Systems; TMIS; A&R; Resource Reqs; Software; & Major Issues & Concerns (NSTS Performance, Safe Haven, 10-6 g, dual egress).

SS-RP-900

DATE	ABSTRACT	ID NO.
85/07/30	This document contains the requirements for the SS Articulated Coarse Pointing System. This document contains no formal written text but instead utilizes charts & lists to relay its information. Included among the topics of discussion in this document are the following: general P/L req, user fine pointing req, gimbaled vs non-gimbaled P/L req, SS pointing req, APS sys req, SS AP pointing sys, & SS AP transverse boom extension sys req. Also included: Rockwell status report concerning APS, a MDAC status report on Combined Mechanisms GN&C Tip Meeting/MSFC-Articulated Platform Status, a MDAC Team Structures & Mechanics Rotary Joints report, a report on Rotary Joints Definition, & a LeRC report on the SS Power Sys.	JSC-SS-ACPSR
85/07/31	This document is an USRA progress report describing activities from 7/1/85 through 7/31/85. Discussed are the research activities of Dr. Douglas ReVelle, Dr. Donald Brownlee of the University of Washington, and Professor J.A.M. McDonnell of the University of Kent at Canterbury, England. Micrometeoroid flux in the near-earth space environment was a topic of interest during this period. This document provides data for all Electrical Power System (EPS) options for the Space Station and Space Platforms except the growth options. The data are an engineering estimate, not the result of a design effort. Power levels assumed in the document are: Initial Operating Capability (IOC) - 75kW; man-tended - 37.5kW; Space Platform - 8kW; and 37.5 for the first launch of the Electrical Power System for IOC.	USRA8-36400 PR1 8400-01046
85/07/85	This status report for the period 24 May through June 1985 describes the progress on the Propulsion Technology Program, NAS8-36418. The objectives of this program are to provide a demonstration of hydrogen/oxygen propulsion technology readiness for the Initial Operating Capability (IOC) Space Station application, specifically gaseous hydrogen/oxygen and warm hydrogen thruster concepts, and to establish a means for evolving from the IOC Space Station Propulsion System to that required to support and interface with advanced Space Station functions. These objectives are met by analytical study and by furnishing a propulsion test bed to MSFC for testing. Major accomplishments during this period are the placement of the Beech subcontract and procurement of the accumulators, microprocessors, and associated controller hardware.	85RC10246
85/08/01	This document contains IOC data, comments, concerns, assumptions, and questions covering the following disciplines concerning the SS: propulsion & fluids, software, mechanical/mechanisms, attitude control system, structures, thermal, electrical generation & distribution, and maintainability. These disciplines are covered for both the RCA and GE/TRW data drop. Operations Planning & Cost, Operations Req for Attached P/L Accommodations, Operations for SLM, Operations Req for SPs, Time Phase & Analyze Resources Req, Annual Operations Cost Estimates, Customer Resource Req Analysis for SPs, Life Science Req Analysis, Platform Req, and Platform Architecture Assessment are also covered. This document contains the appendix to the Task 1 report of the SS Data System Analysis/Architecture Study which sought to define functional req. Appendix A contains the requirements Data Base which includes the following: data base user's guide; derived function list; top down Traceability report; bottom up Traceability Report; Definition of req Entry Fields; directory of functions; requirements data sheets; source document paragraph number to req	EMS R1.3.3 MDC-1343

85/08/01 number cross index; and SSDS Task 1 Report, Comment, Action/status log.

This document discusses DP 2.2 of DR-19. Section 2 considers a Config analysis & presents an evaluation of the reference config sizing parameters for the overall SS & for each WP-02 end items. Section 3 (Assembly Sequence Prelim Definition) identifies the assembly sequence of SS & includes the on-orbit assembly & orbiter packaging of the reference IOC config, MTA, growth, & other configs. Section 5 presents a report of Prelim Structures Loads/Dynamic Analysis which presents data on the reference config. Section 6 (Prelim Resource Reqs) reports on the current status of the MDAC WP-02 effort to request & to receive resource reqs from other WPs & to determine the status on internal MDAC resource reqs efforts. Section 7, entitled Twenty Major Program Themes, reports the EMS tasks for these themes.

MDC-H1995

This document is the July 1985 monthly progress report in the ECLS Integration Analysis Project and it includes the following: a) quantitative description of work performed during work period; b) summary of work planned for the next period; c) summary of problems/concerns; d) summary of manpower expended in the current month, cumulative manpower expenditures to date, estimate of physical completion of contract, & explanation of significant variances. The following were accomplished: simplified General Cluster Model; detailed consumables models; single phase TC; SINDA.6189 Hybrid; oxygen recovery model; data gathering; BMR; & water recovery/subsys model.

MDC W5039-3

This document is the SS Reference Update Review for WP-01 at MSFC. The following topics are discussed herein: Systems- configs; reliability, maintainability & quality assurance; ops; safety; contamination; logistics; commonality; verification; mockup/crew sys; TMIS; CA; reboost; structures/mechanisms; ECLSS; Thermal Control; Electrical/EGSE; DMS/Communications; Software. The end items given consideration in the document are: common module; MTL outfitting; Logistics outfitting; propulsion; vehicle accommodations; integration. The document uses no formal, written text in treating these subjects but instead utilizes charts, graphs, and diagrams.

EL-13591

This document reports on Task 3 efforts of the SSDS. This volume contains updates to Task 3 Trade Studies on Network Topology and Space Qualified Computers, and incorporates recently completed trade studies on System Integration Test & Verification, Space Communication, & Software Transportability. Under System Network Topology Trade Study the following are considered: trade study definition, preliminary analysis, detailed analysis, & issues & recommendations.

MDC-H1943

This report is intended to document the data base verification of the ECLS Systems Assessment Program & changes made to enhance the flexibility of the water recovery subsys simulations. The report describes all changes which were made to the data base values and the software enhancements performed. The refined model documented herein constitutes the MDTSCD submittal of the General Cluster Systems Model described under SOW paragraph h. The tasks reported include: 1) verification of the data base values & component simulations, 2) s/w enhancements to increase flexibility of the program in the water recovery subsys simulation.

MDC W5040

This report summarizes the work accomplished on NAS8-36586, "Protective Coatings Development," from 10 June through 10 August 1985. This

BAC8-36586 TFR1

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85/08/01	<p>study is to ensure technology readiness for Station external surface materials which are exposed to the combined effects of electrons, protons, solar radiation, atomic oxygen, micro-meteoroids, and space debris. The scope is very broad, covering the entire external surface of Station. The document reports on efforts for determining schemes for 1) solar array silver interconnects, 2) coatings for flexible Kapton substrates, and 3) Common Module material surfaces which degrade due to low Earth orbit environmental exposure.</p> <p>This report summarizes work accomplished in the Integrated Wall Design and Penetration Damage Control study during July 1985. The objectives of this contract are: 1) to develop an integrated module wall design for the Common Module that will meet requirements for internal pressure, launch and berthing loads, meteoroid and space debris environment and thermal radiators, and 2) to develop a penetration control plan to assess the effects of primary wall penetration and for module repair/replacement following impact. Discussed in detail in the report are the efforts put forth in order to develop analysis techniques verified by test data that can be used to predict penetration resistance of candidate Space Station wall designs. Used in this effort is the PEN-4 hypervelocity penetration code.</p>	BACB-36426 PR2
85/08/02	<p>This document is a monthly progress report relating to NASB-36585, Rotary Joint Mechanism Test Bed Operation. Work performed in July 1985 is outlined: drawings for rotary actuator completed; control dynamics began analysis of actuators control sys. Future work to be performed was outlined. The current problems with the work were also discussed.</p>	CEB-36585 PR2
85/08/05	<p>This document is a memo which encloses two progress reports from the Vice President of the Vitro Corp. It contains the Monthly Progress Report No. 1 and the Financial Management Report No. 1, both for May and June 1985. Progress, planned efforts, and present status were discussed for the Space Station Maintainability Plan.</p> <p>This document is a monthly progress report for the SS Plume Impingement & Contamination study. The objective of this effort is to develop an improved set of plume/plume impingement codes which will advance the state of the art & improve the accuracy of calculated plume-induced design environments for the SS. During this reporting period, the contour plot code was verified on the VAX for use with flow-field data generated by the Mode-of-Characteristics code. The plot code will generate contour plots for 15 parameter. The plot code generates hard-copy plots using the Tektronix 4014 terminal & 4631 hard-copy unit. The plot program was being examined for use with flowfield data generated by the RAMP2F code. The PLIMP code was converted to VAX-11 FORTRAN & a successful compilation was accomplished. Future work and a financial report are given.</p> <p>This report summarizes the technical progress on the Development of Structural Dynamic Analysis Tools Contract No. NASB-36420 during the time period from contract start on 5 June 1985 to 5 August 1985. During this reporting period, work was initiated on program Tasks 1-5. The following were topics of discussion: reduction techniques for finite element analysis; calculation and incorporation of the geometric stiffness matrix for pre-tensioned trusses; non-linear static, dynamic, and damping models; joint stiffness and damping models.</p>	CO-3 001
85/08/06	<p>This document is a progress report describing the evolution of</p>	LMSC-F042542
		BACB-36420 PR1
		3-14000/5R-7

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85/08/06	activities involving the Body Mounted Radiator (BMR) Systems. The following were activities performed: locations on the module to place radiators for the freezer radiators were investigated; required areas for loads were defined and compared with available area; and circumferential and longitudinal panel locations were compared. The data from the environmental analysis were analyzed for the best indicated locations on the modules to place freezer temperature radiators. Graphs explaining the LOG View to Space are given also.	
85/08/07	This document is the July 1985 monthly progress report regarding SS Logistics Simulation & Data Base Development. The following were items covered during this period, and consequently covered in this report: survey of existing logistics efforts; develop/define tools & techniques for each logistic element; progress on logistics analysis simulation model; progress on logistics data base; delivery of the draft document entitled, Inventory Management System; and, completion of the Logistics Support Analysis Plan. Activities planned for the following month were also discussed.	LOG-MMC-00001
85/08/08	This document is the LMSC monthly progress report for July 1987 regarding the SS Trace Contaminant Control study. The month of July was spent working on SS Trace Contaminant Load Model, SS Contaminant Control Analysis Computer Program, and on SS Cleanliness.	LMSC/F071300
85/08/09	This report is submitted as a monthly progress report for SS Structures Development for work performed during July 1985. During July, work proceeded on all 3 tasks comprising the contract. The Alternate Deployer Mechanism Trade Study was initiated, specimen fabrication began for the composite material coupon test, and concept designs were started for Assembly Structures. The objective of the Alternate Deployer Mechanism Trade Study was to evaluate six deployer concepts in order to select the most suitable design. Task 2 dealt with Advanced Composites Deployable Truss Development.	RICB-36421 MR2
85/08/12	This document is a monthly progress report on the Data Management Network Components activity for the July 1985. During July efforts were expended on obtaining additional materials, reviewing documentation and assembling and testing four of the 16 IBM PC/XT workstations. Materials received are listed. Problems and the planned activities for the next month are given as well.	CCB-36411 FR2
85/08/13	This document is a management plan produced in response to DR-01. This plan presents a clear & concise definition of the req which will be the basis for our design & describes the analysis, studies, & design effort quantitatively in terms of task content, schedule, & magnitude of effort. The subjects covered in the document are the following: Requirements Matrix, Task Descriptions, Planning for Innovation, Managing SE&I, Study Flow, Program Milestones, Time-phased Man-loading, Organization, Documentation Required for SSP, TMIS, and Program Control for SSP.	WP3-MP-2613798
	This document is a management plan which has been prepared according to the DR-01. This plan presents a clear & concise definition of the req which will be the basis for the design & describes the analysis, studies, & design effort quantitatively in terms of tasks content, schedule, & magnitude of effort. Described in detail is the proposed RCA role for aiding NASA SE&I in its system definition. Also described is the RCA approach to innovation with several examples. The organization of the task team and its members are discussed. Methods which will be used for financial, schedule control, & performance	RCA-DR01-1

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85/08/13	<p>measurement, both in SSD&PD & in the design & development stage, are described. The document is divided according to the following subject headings: 2.0)Req matrix; 3.0)Task Descriptions; 4.0)Planning for Innovation; 5.0)Managing SE&I; 6.0)Study Flow; 7.0)Program Milestones; 8.0)Time-phased Man-loading; 9.0) Organization; 10.0)Required Documentation; 11.0)TMS; 12.0)Program Control.</p> <p>This is a monthly report of Boeing activity relative to NASB-36526 during July 1985. This document is organized by module and functional manager. These activities (technical interchanges) were participated in during this period: Vehicle Accommodation and Servicing workshop; Systems Integration Board; Configuration Board; OTV accommodations; Propulsion Working Group; and the RUR-1 "Lessons Learned" Meeting.</p>	2-8291-0020-03
85/08/14	<p>This document is a monthly progress report for July 1985 under the Space Station Maintainability Plan. The report discusses work done on the "Maintainability Design Requirements." At this time, the study is at 70% of completion.</p>	CG-3 002
85/08/15	<p>This document is a LMSC monthly progress report for July 1985 regarding the SS Thermal Storage/Refrigeration System Research and Development. The events described for the report period include: a meeting with Dr. Ron Barile, a consultant to MSFC on thermal storage; a meeting with MSFC personnel to establish initially the state of refrigeration reqs for SS; a meeting with Boeing for the purpose of obtaining cooling reqs for the materials lab module. A table of SS Refrigeration reqs is given.</p> <p>This document provides EMS master schedules which give a chronological outline of SS Level B activities under WP-2. The schedules are ordered by theme. The themes are: R1-STG performance capability; R2-Operations Req; R3-resource req; R4-Design to cost; R5-Customer req; R6-safety; R7-standards development; C1-architectural concepts; C2-growth; C3-module pattern/size; C4-customer accommodations; C5-power option; C6-function allocation; S1-ADP; S2-A&R; S3-logistics; S4-commonality; S5-maintainability; S6-verification & checkout; S7-internal participation; and, S8-operations planning.</p> <p>This document was prepared for MSFC in response to NASB-36525 & is submitted in accordance with DR-14, Monthly Status Report. The primary activity during this period was providing support to MSFC in preparation for RUR-1 which occurred on 7/19/85. Also, the preparation of data for RUR-2 was a significant effort. We are insuring that decisions resulting from RUR-1 are reflected in our on-going studies & analyses through revisions to the EMS & the receipt & distribution of various documents which define these decisions. The second monthly progress review was held at MSFC during this reporting period. The primary effort during the next reporting period will be the completion of DR-19 DP for RUR-2. SE, CM, LogM, MTL, P&VA, ADP, FO, & productivity are discussed in the document.</p>	LMSC-F042559 WP2-SSP-EMS SSP-MMC-00000
85/08/16	<p>This document contains data which were generated as part of the project identified in the SS ADP as Project 21, Integrated Proximity Operations Software. Presented are the results, as of 4/1/85, when the project started, of the algorithm definition & analysis phase of the Integrated Proximity Operations (proxops) Software AD Project. The overall objective of this project was to improve current manual proximity control to an integrated automatic proximity operations control system. Three major tasks were required to complete the</p>	SES85-0050

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85/08/16	proxops control system: algorithm definition & analysis, design & coding of a test & validation s/w package, & the actual testing & demonstration of the control concept.	
	This document is a quarterly management review report which discusses the following: project integration & sys engineering (including study approach, key trades, & RUR decision issues), CM studies (issues, alternatives, & trade study status), LogM studies, MTL studies, and P&VA. Accomplishments for the preceding quarter are also listed, as are planned activities for the next quarter. NSTS performance capability, ECLSS, TCS, EPS, LogM, resupply, & DMS are assessed as well.	SSP-MMC-00011
	This document is a quarterly overview of Space Station activities at MSFC. The program overview covers the following categories: Phase B contract, other contracts, SE&I, TMIS, EMS/RUR, POP 85-2 Operating Plan, and Phase C/D Cost Estimates. An overall schedule for MSFC SSPD activities is given.	SS-PQR-PO-B/85
	This document is a report for July 1985 of the Station Long-Term Lubrication Analysis. The first objective of this program is to perform complete tribology survey of every point of contact in Station subject to relative motion regarding the materials, environment, and operation traits. The following progress was made during July: initiation of literature search and formalizing subcontract with SRS Technologies. The machine search identified several pertinent reports and articles. Problems encountered during this first month were also discussed.	BCDB-36655 PRI
	This document is Volume I of a 3-volume submittal in response to DR-19, Data Package 2.1. The following are considered: Overall configuration (reference config, sizing parameters, drivers & evaluation factors, airlock location & config, config integration, pressurized module interconnect, micro-gravity disturbance analysis, manned systems, man tended capability development, sizing parameters, & component & major assembly arrangement) and Assembly sequence preliminary definition (summary key findings, truss construction, assembly sequence & operations).	SS585-0052
	This document is Volume II of a 3-volume submittal in response to DR-19, Data Package 2.1. Volume II contains data regarding the following: Trade Study Results (CA, logistics/resupply approach, crew safety/rescue, and a summary of results) and Preliminary Structural Loads/Dynamics Analysis (SS Model Data analysis, structure/control interaction, free play, docking/berthing load simulations, pointing errors caused by structural flexibility, large angle SA simulation model, and micro-G caused by crew disturbance).	SS585-0052
	This document is Volume III of a 3-volume submittal in response to DR-19, Data Package 2.1. The topic of this volume is Preliminary Resource Reqs. The following subtopics are discussed herein: 1)Electrical Power Distribution System; 2)Active TCS; 3)Fluid Resupply System; 4)Resource Systems Integration; 5)GN&C Hardware Utilization List; 6)DMS Analysis; 7)CMT End to End Architecture; 8)Propulsion; and, 9)EVA Systems.	SS585-0052
	This is a Boeing Project Management Review document concerning a meeting held 16 August 1985 at which the following Space Station Program review documentation topics were discussed: planning status; Technical Management Information System; productivity; engineering summary; and advanced development.	BACB-36526 PRD

85/08/16 Issues given consideration were: restricting size and capability of the Initial Operating Capability Space Station based on initial cost estimates; a timely configuration decision process; an agreement of Shuttle payloads; the need to prioritize mission requirements; and the decision on the evolution of the Space Station.

This status report for the period 29 June through 2 August 1985 describes the progress on the Propulsion Technology Program, NAS8-36418. The objectives of this program are to provide a demonstration of hydrogen/oxygen propulsion technology readiness for the IOC application, specifically gaseous hydrogen/oxygen and warm hydrogen thruster concepts, and to establish a means for evolving from the IOC Propulsion System to that required to support and interface with advanced Space Station functions. Major accomplishments during this reporting period are the completion of the accumulator hemispherical heads, the selection of valves, the receipt of the microprocessor unit, and the completion of preliminary design.

BSR011637

85/08/19 This second monthly progress report presents a description of program activities at UT-HS during period from 7/1/-8/1/85 in performing SS LLFS program. The basic objectives of this program are to evaluate complex issues associated with SS LLFS, generate workable design configs which satisfy LLFS reqs, & manufacture test h/w suitable for evaluating & demonstrating maintenance technologies. Accomplishments during this period include the following: completed definition of SS TCS; initiated definition of generalized schematics; continued definition of critical components and instrumentation.

HDB-36624 MFA7

85/08/21 This document is presentation material designed to accompany a monthly GE/TRW status meeting in August 1985. The following topics were discussed at the meeting: systems engineering; customer accommodation; laboratory; attached P/Ls; platforms; servicing; SSIS; advanced development; operations; and, product assurance. Accomplishments reported at the meeting include: agreement on changes to DR 01 & DR 05, submittal of initial DR 09 cost estimate, completion of DR 19 SE&I trades study report, provided RUR-1 EMS Theme Report, supported RUR-1 process & follow-on action, and held initial customer advisory meeting.

BSFC-WF3-MS*

This document was produced as a briefing to accompany a monthly status meeting of the GE/TRW WP-3 study effort. The following topics were on the agenda for discussion: an introduction; systems engineering; customer accommodation; laboratory; attached p/l's; SPs; servicing; SSIS; advanced development; operations; and, product assurance. The following accomplishments were noted: agreed to changes on DR 01 & DR 05; submitted initial DR 09 estimate; completed DR 19 (DP 3.1) SE&I trades study report; provided RUR-1 EMS theme report; supported RUR-1 process & follow-up actions; and, held initial customer advisory board meeting. Also discussed: EMS themes for Convergence; WP-3 needs for convergence; man-tended approach; A&R; satellite servicing; SLM; DRU; SA; polar SF; IOC; power sys; telerobotics; &, A1.

GE-MSM-850501

85/08/25 This document contains preliminary data & concepts related to SS reboost reqs. Charts 1 & 2 illustrate the basic reference config upon which drag characteristics were based. Chart 3 shows drag characteristics for these configs based on generalized coefficients for frontal & tangential surface areas. Chart 4 summarizes 90-day orbit makeup propellant reqs for this range of configs for different altitudes. Chart 5 further illustrates the differences in orbit makeup propellant reqs through the 11-year solar cycle; it also shows the annual pro-

SS885-0097

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85/08/25	pellant reqs for the design steady state atmosphere for the SS operating at the 250 nmi. Chart 6 identifies other components in the SS overall propellant budget which are data for the SS at 270 nmi. Chart 7 identifies a number of reboost strategies which are possible & which will be evaluated to determine an efficient solution best meeting customer needs, operational simplicity, & safety.	
85/08/26	This document contains data which were prepared by Rockwell & which comprise a description of data required from other center work packages which are needed as inputs to the WP-2 task analyses. The data are divided into sections according to the anticipated source of information, i.e., NASA Level B and WP-1.	WP2-EMS-DIR-8/85
85/08/28	This document contains an analysis, the objective of which is to identify SS personnel transporting reqs in conjunction with flight frequency & resupply of consumables, nonconsumables, & spares reqs with the least cost. Included in the milestones covered herein: reference config inputs (crew size, rotation, accommodation); crew size & rotation scenario; identification on passenger habitability/accommodation reqs to be imposed on STS; final reqs for crew transportation (number, frequency, accommodations, etc.); definition of crew training reqs relative to STS/SSP interactions; and, unique growth crew reqs.	SSS85-0096
85/08/29	This document is composed of a letter & an enclosure. The letter is from Allen J. Louviere/PB at JSC explaining the oversight which had inadvertently caused information on the C-5 Power Options to be left out of a package of information recently distributed by JSC. The enclosure contains the information on the C-5 Power Option.	PB3-85-096L
	This report describes work performed during July and August 1985 on prototype control moment gyro (CMG) work and forecasted for the next month with mention of current problems and proposed corrective action. The following activities were engaged in during the period: response to action items for Technical review of 25-26 June; CMG model was revised; engineering design, analysis, and drafting activity progressed to detailed design of inner gimbal. Forecasted work included: continue preliminary design activities in advance of the Preliminary Design Review; continue preparation of required trade study documentation; and initiate breadboard circuit evaluation for local electronic circuits.	BENDIX8-36628 FR2
85/08/30	This document containing GE's WP-3 plan also contains the following. In Section 2 the approach to organization & management of the Definition Phase Program is given. Section 3 describes the subcontractor team which contributes a definitive complementary capability & also the subcontractor management & tasks. Section 4 describes GE's management systems for the definition phase- these procedures will be used to manage & control SS WP-3 activities. Section 5 describes the GE Study Plan which facilitates management of the study & ensures a smooth transition into the Design & Development Phase- the plan consists of the WBS, task descriptions, flow diagrams, a documentation matrix, & a milestone schedule. Section 6 gives the S&E Plan. Section 7 gives GE's plan for motivating selecting, measuring, & selecting innovative concepts. Section 8 deals with TMIS & its applicability to the SS. Section 9 lists applicable documents. Section 10 defines the planned resources.	GE/TRW-DR01

DATE	ABSTRACT	ID NO.
85/08/30	This document is a progress report for the month of July 1985 regarding the MADDS Lab Demonstration study. The following work was performed during the July 1985 reporting period: investigation continued on RF, MMW, & IR wireless communication; study of distribution media was initiated to include twisted pair, coax, & fiber optic cable and is approximately 50% complete; and, study of distribution topology to be initiated. Problems, work to be performed during the next reporting period, and cost information are also included.	HACB-36430 FR2
85/08/31	This document is a progress report for August 1985 for SS CM Power Sys Network Topology & H/W Development Program. The following topics were addressed: Task A- reqs definition; Task B- loads data base; Task C- prelim candidate block diagrams; Task D- Network Concept selection. Objectives for Sept. 1985 are outlined herein. This document is a USRA progress report for the period from 8/1/85 through 8/31/85. The subject of activities during this period was the departure of Dr. Douglas ReVelle from USRA	MCR-85-618-3 USRA8-36430 FR1
85/09/01	This document is a MDAC report under WP-02 & is a supplement to DR-19, DP 2.2. This report contains a more detailed analysis of the config definition for the MTA. Data pertinent to sizing the MTA are presented in the form of initial trade study results. Also discussed in this document are: requirements changes since DP-2.1; Strawnan MTA Configuration; Alternate MTA options; Cost versus CA study, including costing, mission capture, analysis, observations, & recommendations; and, summary of End Item Inputs, including heat rejection transport, C&T, GN&C, DMS, & EVA systems. This document is a package of presentation materials presented at a 9/11/85 CMR; it is divided into 2 parts. Part 1 covers the following topics: contract management - schedule status, TSIP status, & Optimizing DR/DP/EMS Data Drops; Technical items- RUR-2 support, module length, power "pancake" config considerations, module pressure, functional allocation / I/F considerations, integrated system schematics, operational/resupply/logistics, subsys technical discussion (DMS, C&T, AC, TC); Special topics- MTA, HM production/assembly location. Part 2 contains a monthly status report which reports on MDAC's work for Aug 1985. It also contains the status of action items & agreements resulting from the 7/24/85 CMR held at Huntington Beach. This document is a report produced under DR-19, DP-2.3 & it is divided into 4 books; this document is Book 1 and it contains Sections 1.0 through 2.4 of the entire document. Section 1 is an introduction to the complete document giving a brief description of each section of the document. Section 2 describes the preliminary overall architecture analysis results for the Space Station in terms of the following: A)Configuration; B)DMS; C)C&T; D)Structural Loads; E) Thermal; F)Control; G)Assembly Sequence; H)STS Interfacing; I)Crew Interfacing; and, J)resources integration. This document is a report produced under WP-02 DR-19, DP-2.3 & is divided into 4 books; this document is book 2 & contains data from Sections 2.5 through 2.10 of the overall document. Section 2.5 provides prelim definition of temperature ranges for passive thermal control; provides prelim heat fluxes for manned config; compares various options for HR&T selections. Section 2.6 describes the GN&C sys architecture & sys design approach. Section 2.7 establishes prelim overall architecture for assembly of the reference config	MDC-H2001 MDC-H2004 MDC-H2002 MDC-H2002

85/09/01 with the "Figure Eight" module pattern & the symmetrical Dual-Keel Config. Section 2.8 presents STS interface subsections for STS I/F Berthing & MRMS/STS Interface. Section 2.9 defines those combinations of crew & equipment that maximize mission success, crew productivity, & safety. Section 10 is to provide preliminary architectural analysis results for resource systems (PMAD, fluid systems, utility distribution systems).

This document is a report submitted by MDAC to fulfill the reqs of WP-02, DR-19, DP 2.2A. Although it gives brief descriptions of 6 other sections of the document, Section 7 constitutes most of the document. Twenty Major Program Themes are discussed: STS performance capabilities & SS; SS ops reqs; resource reqs; DTC; customer reqs; safety; Standards development; architectural concepts; growth analysis; module pattern/size; CA; power option; function allocation; ADP; A&R; Logistics; commonality; strategy- Maintainability; Verification & checkout; and, international participation. See MDC-H1995 DP 2.2 for the remaining sections of the document.

MDC-H1995

This document is a report submitted under WP-02 DR-19, DP-2.3 & is divided into 4 books overall; this report is Book 3 and contains data from Sections 3 through 5 of the overall document. Section 3 provides a conceptual design of the HM Outfitting System by defining & deriving HMD reqs, performing analyses & trades to define HMD drivers on overall SS Config/interfaces, & by defining a HMD sys & subsys conceptual design. Section 4 defines airlock outfitting configs & sizes which satisfy EVA reqs in a cost-effective manner by defining work reqs, performing functional analysis, performing subsys selection trades & analyses, characterizing equipment & activities, & analyzing config options. Section 5 contains a cost methodology.

MDC-H2002

This document is a report submitted under WP-02 DR-19, DP-2.3 and is part of a 4-book set; this is Book 4 which covers Sections 6 through 9 of the overall document. Section 6 is to develop & refine an integrated end-to-end sys architecture to meet user need & growth reqs, provide a systematic allocation of functional reqs to SSPEs I institutional resources, & to perform trades & analyses to support key decisions & show sensitivities to driving reqs. Section 7 is to provide tested h/w, s/w, & procedure concepts to support subsys design of the IOC SS by impacting cost, risk, & performance drivers. Section 8 present the current version of WP-02 element conceptual design layouts & indicates status of design data for elements by other WPs being used by WP-02.

MDC-H2002

This document is the August 1985 monthly progress report for the ECLSS Integration Analysis Project. This progress report includes: a)quantitative description of work performed during work period; b)summary of work planned for next reporting period; c)summary of problems/concerns; d)summary of manpower expended in the current month, cumulative manpower expenditures to date, estimate of physical completion of contract, & explanation of significant variances. Accomplishments during the period involve the following: simplified General Cluster Model; detailed Consumables model; oxygen recovery model; water recovery model; single-phase TC; BMR; H/W procurement to support NASA EP45; cluster equipment cooling; &, air temperature control & flow distribution.

MDC W5039-4

This document is the Management Plan prepared in response to DR-01. It defines the MDAC planned method of accomplishing the tasks set forth in the SOW to achieve NASA's WP-02 objectives. The plan serves as NASA's primary control document for MDAC's conduct of the effort & as their top management control

MDC-H1407A

85/09/01 plan. This document contains all of the information requested in DR-01 for the man-tended & permanently manned SS Management Plan & outlines tasks to be accomplished. Included in the discussion are the following: study logic & task schedule; organization & WP-02 task relationships; task description; SE&I plan; WP-02 reqs matrix; MDAC approach to innovative concepts and enhanced productivity; TMIS description; resources, scheduling, & performance management; and, government-furnished support documentation/information reqs.

This document is the ninth bi-monthly RI report on GTA. This report details the delivery of the GTA to MSFC as of 8/1/85 and the other pieces of information which accompany that event. The document also lists the other work which remains to be done.

RIC8-34657 BMR9

This document provides a description and preliminary users' manual for the SS Detailed Cluster Consumables model prepared in accordance with the ECLS Integration Analysis Contract SOW. The SS Detailed Cluster Consumables model provides a transient tracking of Oxygen, Nitrogen, water, and related consumables within the SS cluster. The model allows the rapid assessment of SS ECLS resupply impacts resulting from changes in metabolic forcing functions, subsys technology selection, as well as man-related consumables resource usages, such as wash, hygiene, & lab water usage. In defining the architecture of the Consumables model, the following factors were considered: user must be able to change quickly the modeled sys interconnects & component technology; user must have access to component performance parameters for editing; &, output must be provided in a clear & concise form.

MDC W5055-1

This report is to document changes made to both the data base & the water recovery subsys simulation of the ECLS Sys Assessment Program. This report describes all revisions which were made to the data base values & the s/w enhancements performed. This document is submitted in accordance with NAS8-36407, ECLS Integration Analyses, SOW Paragraph b, and constitutes an update to the Simplified General Cluster Systems Model documented as MDC W5040. This document documents additional updates to the data base values & further refinement of the water recovery sys simulation.

MDC W5040-2

This report summarizes the work accomplished on NAS8-36586, "Protective Coatings Development," from 10 August through 10 October 1985. The objective of this work effort is to ensure technology readiness for Station external surface materials which are exposed to the combined effects of electrons, protons, solar radiation, atomic oxygen, micro-meteoroids, and space debris. Program accomplishments in the following Task Elements are discussed: 1) Candidate materials and environments; 2) performance requirements; 3) critical technology; 4) developing/testing; 5) demonstration of technology; 6) materials usable specifications; and 7) materials data base development. Current problems and work planned for the next period are also discussed, as is subcontractor status.

BAC8-36586 TFR

85/09/02 This document is volume 2 of the WF-3 EMS Data Package and discusses Configuration. The following topics are included: AP Special Accommodations Definition; Special Accommodations for SLM; Customer SP Recommendations Definition; AP Customer Accommodations Assessment; Evaluation of Customer Accommodations-SLM & SP; AP Analytical Models & Tools; AP Thermal Model; Field-of-View Analysis; SP Commonality Analysis; AP Function Listing; and, Allocation Criteria for PAE.

RCA-EMS9-2

DATE	ABSTRACT	ID NO.
85/09/02	This report summarizes the work accomplished in the Integrated Wall Design and Penetration Damage Control study during August 1985. The objectives of this contract are 1) to develop an integrated module wall design for the Common Module that will meet requirements for internal pressure, launch and berthing loads, meteoroid and space debris environment and thermal radiators, and 2) to develop a penetration control plan to assess the effects of primary wall penetration and for module repair/replacement following impact. This document discusses progress made in establishing analysis methods such as penetration models that are applicable in restricted velocity ranges. Results of an evaluation of Boeing baseline configuration using the penetration model described herein and the debris environment for a 500 km orbit at 30 degrees inclination for 10 years are given. Future plans are also discussed.	BACB-36426 PR3
85/09/04	This document contains mass properties data for the SS in IOC Config as it appears at RUR-2. The data include coordinate sys definitions for both the modules & SS. A summary of the percent of each subsys weight which is estimated, calculated & actual, total fluids weights contained in each subsys, inertias in both the SS & module coordinate sys, a weight change (RUR-1 to RUR-2) summary, top level weight summaries & subsys level weight & center of gravity data. The detailed parts lists are contained in appendices to this document. Within this document a common module item is defined as an item which is used in any two modules.	D483-50037-1
85/09/05	This document is a monthly progress report of the SS PLIMP & Contamination study for August 1985. The objective of this effort is to develop an improved set of plume/plume impingement codes which was to advance the state of the art & improve the accuracy of calculated plume-induced design environments for the SS. During this period, the PLIMP code, which was primarily converted to VAX-11 FORTRAN, has now been executed on the VAX 11/780. A simple example of 3 rectangular plates was used in an RCS plume. The plates were positioned so that the partial shading capability of the code could be verified. The sample was run initially with the code ordering the RCS flowfield data, then with the code using the ordered data from a previous run. The code appeared to be functioning properly, but the numerical results were not verified. The contour plot code was verified with RAMP2F data. Future work and a financial report are given.	LMSC-F042572
	This report summarizes the technical progress on the Development of Structural Dynamic Analysis Tools Contract No. NASB-36420 during the period from 5 August 1985 to 5 September 1985. Tasks 1 and 2 are summarized in Attachment 1. Task 1 involved triangular girders, trusses, and joints. Task 2 concerns test joint articles and joint test equipment. Task 3 discusses candidate suspension system as it relates to the truss.	BACB-36420 PR2
85/09/06	This document comprises Data Product 3.2 of the Time Phased SE&I Study Products deliverable to GSFC and is part of volume II which deals with the subject of configuration. The document is sub-divided into 3 subject topics: architectural concepts, growth, and module pattern & size. The following are covered under each topic: Arch concepts- integration of SLM, of servicing, of customer accommodations, & cost; growth- req & concepts of SLM, attached P/Ls, customer servicing, growth increments, SCAR definition; module pattern/size- internal traffic analysis, number of modules, hatch size, and airlock location.	GEDP3.2

GEDP3.2

- 85/09/06 This document concerns itself with WP-02, DP 2.2B EMS theme "Ground Accommodations and Storage." Ground accommodations & storage reqs are identified & developed from ground & operations support scenarios/analyses; this includes the impact of consumables & h/w reqs on facilities & warehousing. Preliminary identification of consumables is included on the data sheets as part of the resupply reqs & frequency analysis. These consumables, h/w items, & weights are those needed to support SS ops only at the resupply frequency & crew size specified. Criteria reqs, dictating h/w ground return/recycling, have been identified. Spares warehousing & overall facilities reqs options are evaluated for on-orbit & ground. Options for on-orbit & ground spares management & transportation have also been identified. SSS85-0120
- This document contains a discussion of the subject of Maintainability Methodology, which covers the interaction/interrelationship of all 4 WPs with an emphasis on the allocation of annual crew maintenance actions to each WP to be used as key drivers/control parameters for the overall maintainability program. The WP-02 maintainability program & related methodology cover the application of the WP-02 portion of this maintenance/allocation to the design & development of a maintainable WP-02 product. This approach centered around performing a standardized maintainability analysis on each of the 13 WP-02 subsys, comparing that assessment to the allocation with re-allocation or additional design considerations/improvements made to correlate the achievable to the allocated goals. This included definition of and distribution/application of a detailed set of Maintainability design criteria, e.g., ORU packaging concepts, ORU locations, EVA alternative candidates, and MTBF goals. SSS85-0106
- This document contains a listing of all missions used for testing the configuration based upon SATS; the missions are grouped according to SS location of upper, lower, keel, micro-g/lo-g, & satellite servicing. The listing gives mission code & name and also shows in which SATS the mission is found, the view or gravity reqs, length, width, height, & mass. The lists are separated with respect to near-, mid-, & long-term time considerations; within each term the daily average power, operational days/yr, IVA/EVA hrs/yrs, OMV/OTV flights/yrs are considered. Following these lists are bar charts that show total power OMV & OTV reqs. Major emphasis was placed on assessing the reference config capabilities to accommodate structurally the missions listed in the SATS; vertical & horizontal flight modes were studied. Single & dual keel configurations were also assessed as to their ability to accommodate better APs. SSS85-0122
- This document contains parametric drag & orbit makeup propellant reqs data for use in WP-04 power system trades. Specifically, data are shown for solar voltaic & solar dynamic configurations at operating altitudes of 270 & 250 nmi. Charts 1, 2, & 3 illustrate the basic reference configurations upon which drag characteristics were based; a solar voltaic growth config was also analyzed. Chart 4 marks off CDA values for IOC & growth configurations with solar voltaic & solar dynamic options. Chart 5 summarizes the 90-day orbit drag makeup propellant reqs for the range of configurations studied using different altitudes & atmosphere models. SSS85-0107
- This document covers a WP-02 EMS activity, the primary objective of which is to develop ground verification flow networks depicting overall verification program logic, candidate tests w/ high level flow & location of various tests. The ground verification flow encompasses the activities from component/subsys development & certification thru integrated subsys performance SSS85-0109

85/09/06 verification. Figure 1 illustrates the overall flow process. Figure 2 presents an expansion of the flow identifying the generic activities & primary objectives. Verification logic networks are presented in Figures 3, 4, & 5 for GN&C, DMS, & C&T. First, components/DRUs of individual end items are identified. Definition of development tests is made. Consideration is given to integration w/other WP elements. Figures 6, 7, 8, & 9 present Preliminary logic networks for Heat Rejection/Transport, Propulsion Sys, HM Outfitting, & Assembly Truss & Structure. Figures 10 & 11 present logic networks for Airlock & Mechanical Systems.

This document covers a WP-02 EMS theme, the objective of which is to determine the most cost-effective method of using protoflight h/w used for qualification testing. Table 1 presents the preliminary results of an assessment of the advantages & disadvantages of the protoflight concept as compared to the use of dedicated test articles. A number of candidate major ground tests have been identified which reflect integration of flight h/w for ground testing: Alpha Drive/Energy Storage Module, Attitude Control & Communication Module, Thermal Control Module, Primary Truss Structure.

SSS85-0112

This document covers a WP-02 EMS theme, the objective of which is to perform preliminary trades to identify those reqs &/or issues which can be verified totally by analysis, by combination of test & analysis, or totally by test. Key factors in the evaluation include: h/w criticality; support resource reqs; maturity of design, h/w, &/or analytical techniques; &, h/w redundancy & capability for repair.

SSS85-0111

This document describes a study undertaken in order to determine the ability of the SS reference config to support P/L reqs; in other words, is there a need for increased area for attaching P/Ls with micro-g, nadir, zenith & servicing reqs. Payload structural, power, OMV, OTV, & crew reqs for SATS 1-5 were the basic parameters of the study. Bar graphs are attached which show the total power, OMV, & OTV reqs.

SSS85-0123

This document describes the WP-02 EMS theme entitled "Special Tool Requirements." This describes special tools for SS applications which must be viewed from several perspectives. Several of the needs pointed out in the document are: 1) importance of special tools that have legitimate & unavoidable applications should be systematically identified, and 2) there is a growing awareness that certain special, but multi-application, tools will prove to be cost-effective by eliminating the need for many single-application standard tools. The program under consideration is dedicated to an optimum solution of the foregoing issues.

SSS85-0103

This document discusses a WP-02 EMS theme, the objective of which is to perform trades & establish an optimum balance b/w ground & on-orbit verification testing. The following are considered in evaluating ground vs. on-orbit testing: complexities of simulating zero G, stringent reqs for combined space environments, time span required for acquisition of valid test data, cost of delivery to orbit & test support, and cost of ground test facilities. In the assessment of each end item development issue, particular attention was given to determining candidate tests that either require or benefit from actual space environment conditions. Table 1 summarizes initial assessments of candidate on-orbit verification tests which ultimately may replace or supplement ground tests.

SSS85-0110

DATE	ABSTRACT	ID NO.
85/09/06	This document discusses the WP-02 EMS theme entitled "Time/Skills Analysis." Maintainability, MTTR on crew workload, scheduled maintenance & servicing task times, quality of design features, personnel skills, and A&R are discussed, as well.	SSS85-0102
	This document discusses the WP-02 EMS Theme of On-Orbit vs. Ground Repair. The decision of where to conduct maintenance & repair of SS ORUs, assemblies & components (either on-orbit or ground) must be an integral part of the design process since many major design & economic considerations are affected. These considerations include: 1)the sizing & adequacy of on-board storage facilities for spares, repair parts, test equipment, etc. needed to support the repair level decision, and 2)the sizing & adequacy of an on-board work station, in terms of its ability to support efficiently the maintenance workload.	SSS85-0101
	This document examines WP-3 R1 & R2 requirements for the following: SLM Module Outfitting Approach; Alternative SLM Outfitting Approach; Reboost Analysis; WP-3 Element Characterization for Operating Altitude Study; and, IOC PIP Preparation & Update.	RCA-EMS9-1-1
	This document is a monthly progress report for the period ending 31 July regarding the the Electro-Optical Sensor Assembly study. During July, the major emphasis was on completing the base plate assembly design. Also discussed was the machining of a breadboard base plate, and feedthroughs were installed. Another activity reported on was the preparation of a functional description of the sensor input/output (I/O) electronic assembly.	BASDB-36627 FR2
	This document is a theme input, acting as a summary of the Maintainability Analysis. This summary contains a description/identification of analysis of GN&C & includes: 1)the maintenance concept, 2)the ORU alternatives analysis, 3)the assessment of annual crew workload for use in the assessment vs. allocation process, 4)MSI's, 5)MBTF's goals for MSIs,& 6)critical cost factors. This analysis will support the analysis relating to and the development of the other maintainability EMS themes.	SSS85-0105
	This document is a WP-02 DP 2.2B document which takes for its EMS theme, "Define Sparing Approach." This EMS document discusses a spares methodology which has been developed. Most logistics reqs have been identified, including spares provisioning. According to this theme, all ORUs & LRUs must be identified to determine ground & on-orbit spares quantity, storage, & facility reqs resulting from LSA & spares provisioning. An initial candidate list of ORUs & LRUs is included in an appendix. Orbital alternatives analysis is also described in an attachment to this document. Critical ORU identification criteria, interfaces, & interrelationships are defined & are included herein.	SSS85-0119
	This document is a WP-02, DP 2.2B EMS theme submittal dealing with SS-to-SP commonality analysis, the overall objective of which is to define the options for cost savings through identification of h/w & s/w common usage items, with the scope of the effort encompassing both coorbiting & polar orbiting SPs. Also, the identification of commonality candidates will include related systems & subsystems to the ORU level, support equipment, procedures, & applicable training requirements. This document focuses on (1) officially documenting the data of the informal technical exchange b/w WP 2 & 3 contractors, with further refinements applied where possible and (2)updating pertinent commonality selec-	SSS85-0135

85/09/06 tion criteria previously submitted under Data Joint 2.1 essentially for the results of a further maturing of the commonality analysis proper.

This document is book II, volume 1 of the WP-3 requirements report. Discussion in the document includes resource req, design to cost, customer req, and, safety. Subthemes include discussions of requirements for the following under each of the major headings: resource req for AP; life sciences req analysis; pointing req analysis; AP requirements analysis; request & collect req for customer operations & servicing; dual egress req/impact; module isolation req/impact; emergency definition & containment; inputs to distributed ECLSS; inputs to redundant control station; inputs to req & timing.

RCA-EMS9-1-2

This document is volume 3, Policies and Strategies, of the WP-3 EMS Data Package. The objectives of this document are to: define logistics items, quantities, etc.; analyze module commonality; examine special tools req; analyze maintenance, including time/skills req; analyze on-orbit vs. ground repair; analyze ground vs. on-orbit verification trades; analyze protoflight vs. prototype verification; examine growth verification; analyze checkout req; analyze ground vs. on-orbit checkout trades; and, examine CS verification and checkout.

RCA-EMS9-3

This document presents interim cost assessments for WP-3 EMS. The following items connected with the SS have their costs assessed: SPs, CS, SLM, & AP. There are cost estimates for 3 optional SPs (Integrated Core SP, Modular Core SP, & Alternative Configuration) in constant 1987 dollars. Concerning the assessment of CS, each configuration option studied is costed, including non-recurring & recurring h/w costs, launch support req & crew operations costs. 2 SLM outfitting options were assessed, one employing a small centrifuge & one employing a large centrifuge; costs are based on module layouts defining the science/life science equipment that could be accommodated by each option. The AP assessment addresses the cost implications of option selection for the Design Optimization & System Selection architectural options; 4 specific options are Horizontal Flight Mode, Solar Oriented Payload Accommodations Beyond the Alpha Joint on the Transverse Boom, Truss Size, and Module Location.

RCA-EMS9-4

This document takes "Growth Verification Approach" as its WP-02 theme. The major objective of the verification plan for SS growth items under discussion is to create a complete, orderly, & cost-effective plan. The problem that is to be hurdled concerns the planned, scheduled, & unscheduled growth of the IOC SS which creates a new issue for the verification of equipment/systems scheduled to be installed on an orbiting SS, without the benefit of interfacing & mating systems available on the ground for mating checks. The 3 modes of SS evolutionary growth studied are: replacement of existing equipment, evolutionary equipment improvements, & replication with advanced state-of-the-art equipment. For this report, based on experience on the STS program & intuitive judgment, verification of growth equipment will be performed prior to launching to orbit, using mockups, prototypes, & simulations, as much as possible.

SSS85-0113

This document takes Accessibility Studies for its WP-02 EMS theme. This study is to examine the problem of accessibility of equipment within aerospace systems. For example, the necessity of removing one piece of equipment in order to gain access to another is a problem which must be solved. The result of these problems is unproductive labor expenditures & needless wear & tear on operable equipment. A problem in the past was the physical placement of

SSS85-0104

85/09/06 equipment in remote regions of the spacecraft; this placement necessitated the use of special handling equipment and often posed a safety hazard to maintenance personnel. Both of these problems are to be eliminated in the SS design.

This document takes Bite & Instrumentation Analysis as its WP-02 EMS theme. This document discusses a major goal of the SSP, i.e., to be ultimately predominately autonomous from ground control. The way to do this is by providing the SSP w/automatic health statusing, fault detection, & isolation of the fault, & corrective action required. Discussed, therefore, are built-in test capability & the s/w w/in every subsystem which are considered essential to free the crew as much as possible from everyday checkout & routine maintenance. The issues of complexity vs. simplicity, future growth, & distribution of BIT/Bite functions are discussed as they relate to checkout, maintenance, repair, & re-verification.

SS585-0115

This document takes for its EMS theme Fault Tolerance/Maintainability Analysis. Discussed herein is the interaction/interrelationship of all 4 WPs with an emphasis on the analysis & allocation of annual crew maintenance actions to each WP to be used as key drivers/control parameters. This approach centers around performing a standardized maintainability analysis of each of the 13 major WP-02 subsystems. This included definition of distribution/application of a detailed set of Maintainability design criteria, e.g., ORU packaging concepts, ORU locations, EVA alternative candidates, MTBF goals, etc., that support achievement of the GN&C predicted maintenance actions/year.

SS585-0053

This document takes for its WP-02 EMS Theme "Ground Checkout Reqs." This document discusses the manufacturing checkout operation which is an integral part of the verification program. On-going activities include development of the acceptance test & checkout flows for the remaining end items, systems, & elements for various configuration concepts. This will form a basis for definition of detail subsystem & end item I/F checkout activities, facilities, & common support equipment reqs.

SS585-0116

This document takes for its WP-02 EMS theme "Verification Envelope." The primary objective of this activity is to define a preliminary envelope for component & element verification. The envelope is to address the natural & induced environments to which h/w is to be exposed during ground & flight ops. Also considered in this activity are considerations associated w/certification & acceptance screening criteria & guidelines for long-life h/w. On-going activities include development of a matrix which addresses appropriate environments for which h/w items must be certified.

SS585-0114

This document takes for its WP-02 EMS theme the following: Define Logistics Items. This document discusses the definition of logistics items for SSP which includes identification of ORU candidates, preliminary weights & volumes available for customer use, & identification of quantities. This data is used in all areas of logistical support for planning purposes. Preliminary lists of candidate ORUs & LRUs are identified; preliminary weights available for customer use have been identified and vary with resupply flight frequency & crew size supported; LSA options/criteria are being evaluated for tailored approach; and, spares selection method was established which evaluates OPS reqs.

SS585-0118

This document takes Ground v. Orbit Checkout Trades as its WP-02 EMS theme. It discusses the need for assessing criticality of sys/function to safety

SS585-0117

85/09/06 or operation of the SS before making a decision whether to perform the checkout of a specific system/function on the ground, on-orbit, or both. Other considerations are: whether performance of the sys checkout requires complex GSE; whether the checkout cannot be performed on the ground because function is not exclusive to subsys & I/F w/other systems is required; and, whether checkout requires EVA support. The basic premise for the checkout of SS systems & elements is that it is more cost & schedule effective, creates less risk, if checkout is performed on the ground as a total entity prior to delivery on orbit.

This document which describes WP-02 EMS Theme "Safety," is grouped into 3 sections. Section 1 is a schedule from a WP-02 perspective. Section 2 provides the initial input depicted on the schedules in Section 1. These inputs consist of the following titles & contents: 1)Dual Egress- scenarios which may result in SS module evacuation or abandonment; 2)Distributed ECLSS- scenarios indicating the need for a distributed ECLSS; 3)Module Isolation: scenarios that would necessitate the isolation of a module; 4)Emergency Definition/Containment- identification of threats, emergencies, & contingencies which may require containment; 5)Redundant displays/controls- identification of scenarios which may require a redundant control capability to mitigate safety issues; 6)Rescue Reqs/Scheduling-identification of scenarios which may necessitate abandonment of SS &/or crew rescue; 7)AP Safety Reqs-identify threats driving AP design & ops; 8)Critical function C&W analysis; and, 9)Servicing Safety Reqs.

SSS85-0108

This is a WP-02, DP 2.1A EMS theme document which discusses Growth Requirements & Concepts Analysis. The dual objectives of this theme are (1) to define time-phased SS system-level functional & operations reqs and (2) to develop a growth plan for WP-02 elements & systems such that future reqs are met. The document includes: preliminary set of integrated time-phased growth reqs for WP-02 elements, developed from user reqs reference sources and prelim recommendations, which integrate WP-03 & WP-04 growth considerations, for overall core SS configuration growth concepts that match the time-phased user accommodation reqs. The results of growth studies were sufficient to provide at least a prelim assessment of primary growth drivers- crew size, volume, & power- some tentative conclusions & identification of promising growth options are also included.

SSS85-0147

This is a WP-02, DP 2.1A EMS theme document, the subject of which is Growth Increments & Limits Definition. The 3 objectives of this document are (1) to define growth increments & limits for WP-02 elements/systems, (2) to establish total system & specific configuration growth increments, and (3) to provide recommendations for replication based on total system impacts & program reqs. The following data products are also included: identification & discussion of growth evaluation criteria & rationale; preliminary definition of increments for overall core SS & SP configuration growth concepts; &, preliminary assessment of growth limits based on WP-02 elements, integrating WP-03 & -04 growth considerations.

SSS85-0144

This is a WP-02, DP 2.2B EMS document which takes as its activity to provide updates to the systems & ops reqs. The scope of this task is to make updates to RFP sections C3 & C4 at RUR1 & RUR2 based on the results of the trades & analyses of WP-02. Attachments 1 & 2 contain the overall manned & man-tended SSP reqs data for WP-02. This data is being used in our development of the sys & ops reqs specifications. The reqs established with this task include providing

SSS85-0131

85/09/06 NASA Level C w/recommended changes to the ops & sys reqs specifications thru the results of the current trade & analysis activity.

This is a WP-02, DP 2.2B EMS theme document concerning SS Internal Traffic Analysis Including Isolation. The discussion herein represents the issues & analyses that address the impact of crew traffic patterns & isolation on crew productivity, comfort, SS function, & safety. Reqs for crew isolation for purpose of privacy & safety have been evaluated. Module size, number and & patterns were analyzed. The reqs for dual pressure SS were examined. Analysis included discussion of the significant psychological effects to the crew. Also, considerations of traffic flow, productivity, operations, & safety reqs were studied as integral aspects of crew module interior config design activities.

SSS85-0141

This is a WP-02, DP 2.2B EMS theme document considers the solar PV power generation option.

SSS85-0137

This is a WP-02, DP 2.2B EMS theme document dealing w/Element Characterization for Operating Altitude Study. The objective of this analysis is to characterize WP-2 elements for a SS operating altitude study in accordance w/ EMS Task R12042. Data is provided on the following subsystems: Truss structure; airlocks; TCS; EVA sys; Power, Thermal, Bimbals; Manipulators; Resource Integration; GN&C; C&T; and, HM outfitting. For each of these subsys, weight, dimensions, frontal area, & coefficient drag are parameters which have been addressed.

SSS85-0138

This is a WP-02, DP 2.2B EMS theme document which contains preliminary subsys functional allocation I/F schematic charts; these were developed to identify & recommend WP I/Fs for establishing WP boundaries. These schematics depict reference BL & will be updated continuously throughout functional allocation study. These schematics illustrate prelim responsibilities of subsys & the 4 WPs in support of the functional allocation process. Potential conflicts are identified on the schematics when there is a question concerning which subsys & which WP should be allocated. Subsys schematics were derived for each of the following subsystems & are shown in Figures 1-7: TCS, propulsion sys, fluid resupply sys, GN&C, EPS, C&T, & DMS.

SSS85-0129

This is a WP-02, DP 2.2B EMS theme document which describes the activity which involves the collection & distribution of requirements & operations constraints data in compliance with EMS Data Requirement R2.2.1. The document contains a copy of the EMS data sheet.

SSS85-0134

This is a WP-02, DP 2.2B EMS theme document which discusses the allocation of subsys hardware to SSEs. The following are subsystems considered in this document: TCS, GN&C, power sys, propulsion sys, fluid management sys, DMS, C&T, EVA sys, manned sys, ECLSS, structural elements, & mechanical elements. The document contains SSE matrices which were developed to reveal h/w allocations. The matrices contain the h/w items used for each subsys of the SS.

SSS85-0128

This is a WP-02, DP 2.2B EMS theme document which is a preliminary input for WP-04 on control requirements for each power option configuration (PV SA & solar dynamics).

SSS85-0130

This is a WP-02, DP 2.2B EMS theme submittal dealing with module commonality study, the chief objective of which is to define the options for

SSS85-0137

85/09/06 cost savings thru identification of h/w & s/w common usage items; the scope of the effort will encompass network distribution systems which include primary & secondary structure, ECLSS, DMS, EPS, TMS, & communications. This submittal documents interim commonality potentials of the common module in the sys/subsys areas of DMS, power generation/distribution, thermal communications, ECLSS, & structures & mechanisms. The product of this analysis will be the identification of commonality candidates, their applications across all segments of the SSP (including Common Module), and their impacts in terms of cost and technical risk.

This report is submitted as a monthly progress report for SS Structures Development activities. It briefly details the work performed during August 1985 & describes the work planned for September 1985. Work in August focused on Tasks 1 & 2 of the contract. Emphasis was placed on Task 1, Development of Alternate Deployment Sys, and Task 2, Advanced Composites Deployable Truss Development. On Task 1, concentration was on Alternate Deployer Mechanism Trade Study. Efforts related to Task 2 concentrated on the coupon test program to verify material properties & on a trade study to evaluate the application of advanced composites to the truss strut end fittings and center joints. Work on Task 3 did not receive emphasis during August.

R108-36421 MR3

This WP-02, DP 2.1A EMS theme document deals with SS Subsystem Assessment which was mandated by the EMS Architectural Concepts Theme. To be included was an assessment of all WP subsystems highlighting the issues for each subsys option & assessment of each subsys capability to meet overall program reqs. These WP assessments were evaluated vs. corresponding WP-02 subsystems. This report is intended to supply Architectural Concepts subsystem assessments on the structure, mechanism, thermal, GN&C, C&T, and DMS.

SSS85-0142

This WP-02, DP 2.2B EMS theme document addresses the topic of the functional allocation of a portion of subsystems which cross WP boundaries and the criteria for this allocation. This will serve to identify the subsystem WP interfaces which best further the SSP. This document contains a set of prelim criteria to be utilized in supporting the allocation of junctions & h/w to the many SS elements & systems.

SSS85-0127

This WP-02, DP 2.2B EMS theme document concerns the Alternate Module Outfitting Approach. This submittal describes the RI alternate module outfitting trades & analysis regarding mass properties. The analysis considers the weight lifting capacity of the Orbiter for a 270 nmi, 28.5 degree orbit plane. The scope of this data output covers the 2 alternate modules & the various alternate methods of transporting the reference configurations when the results show that weights exceed the Orbiter launch weight limitation of 17,236.8 kg.

SSS85-0135

This WP-02, DP 2.2B EMS theme document deals with CA Assessment. The activities under discussion include those which permit the development of reqs, including the analysis of CA reqs, identifying & assessing design drivers (e.g. contamination & microgravity), time-phased mission reqs, & assessment of design from the user's point of view. The assessment of the design is based upon the concept that design-to-cost is a key criterion, & that the SS can provide some level of resources & services for some BL cost. The tools & methodologies used are described, together w/examples, in the attachment; these tools were developed as a means for sorting p/l's to develop integrated mission sets.

SSS85-0124

DATE	ABSTRACT	ID NO.
85/09/06	<p>This WP-02, DP 2.2B EMS theme document has a scope which contains analyses & results of the following subjects: 1)Effects of STS plume impingement on SS attitude control; 2)Docking port motion during Orbiter proxops; 3)Prelim SS RCS contamination effects on the SS SAs & radiators; and, 4)arrival & departure scenarios of the STS & DMV vehicles. These trades & analyses are part of an on-going effort necessary to define the effects of plume interaction w/SS config selection.</p> <p>This WP-04 EMS theme document takes as its EMS item the following: Reboost Analysis Constraints. The objective of the activity reported on herein is to identify sensitive EPS elements & to provide WP-01 with the information regarding the tolerance of these elements to the disturbances associated with reboost of the SS during routine operation. The objective of this particular submission is to provide the best information currently available for the PV option and for the SD option for EPS.</p>	<p>SSS85-0125</p> <p>RUR2-6EMS-R1.4.3</p>
85/09/08	<p>This document is a monthly progress report for the month of August 1985 regarding the SS Trace Contaminant Control study. The month of August as reported in this document was spent working on the SS Contaminant Control Analysis Computer Program, on SS Cleanliness, and on updating the SS Trace Contaminant Load Model.</p>	LMSC/F071306
85/09/09	<p>This document is a monthly progress report for NAS8-36585, Rotary Joint Mechanism Test Bed for August 1985. Work performed during that month included: completion of assembly drawings of Rotary Test Actuator and Simulator Load Torque Motor System; study of using new torsional spring rate which caused resonant frequency to increase; meeting with HP dealing with reqs for testing, computation, and data storage/printing. Work to be performed during the next period was also discussed.</p> <p>This document is a progress report for August 1985 regarding the MADDS Lab Demonstration. The following work was performed during August: the wireless communication study was completed; the distribution media & topology studies have continued with the distribution media study approximately 80% complete & the topology study 50% complete; a Technical Interchange was held with NASA/MSFC personnel & consideration by HAC of an accelerated Phase 2 schedule was requested. Current problems, work to be performed during the next reporting period, and cost information are also provided.</p> <p>This is a WP-02, DP 2.1A EMS theme document pertaining to an analysis of the number of needed SS modules. The objective of this study is to define the number of modules required by SS based on habitat & lab volume reqs, STS constraints, & configuration & operations impacts. Final output should recommend the best number of common modules to incorporate in initial operating config (IOC) & growth SS designs, based on program reqs. It also includes the following data products: identification of habitation & lab volume reqs for initial & growth SS and interim results of module number trades/analysis.</p> <p>This is a WP-02, DP 2.1A EMS theme document, the subject of which is Integration Assessment. The Integration Assessment is intended to ensure the compatibility of all systems within WP-02 and to ensure satisfactory I/Fs with the systems being designed & developed under other WPs. To accomplish this task SS candidate configurations are categorized & documented. The data from this WP are synthesized with data packages from the other WPs for all candidate SS</p>	<p>CEB-36585 FR3</p> <p>HACB-36439 FR3</p> <p>SSS85-0145</p> <p>SSS85-0146</p>

DATE	ABSTRACT	ID NO.
85/09/09	configurations & checked for compatibility &/or recommendations. Also considered are commonality, maintainability, logistics, & growth capability. This data submittal uses the single keel "Power Tower" config as a BL w/trade studies.	
85/09/10	This document is a monthly report on Data Management Network Components activities for August 1985. During August 1985 the following efforts were expended: materials were received and physical inventory was taken to verify the accuracy of records--the material status is depicted in a table contained in this document. Problems and efforts for the next month are also discussed.	CCB-36411 PR3
85/09/11	This document is a monthly progress report on the Space Station Maintainability Plan for August 1985. The topic for discussion was the Maintainability Design Requirements.	CG-3 003
	This document is a progress report for July and August 1985 regarding the Attitude Control System Test Bed Modification and Refurbishment study. The report describes the work performed during the report period and forecasted for the next month. Described are the following activities: engineering design; analysis and drafting activity which was continued on all required modifications and their progres. Current problems and plans for the future were also listed.	BENDIXB-36408 PR3
	This report documents a Project Management Review held on 11 September 1985. Included are schedules of Phase B activities. A review of Common Module sizing is given and considers Space Shuttle performance and CG limits, on-orbit outfitting, assembly altitude, and growth. Project Management Review integration is also considered, including systems engineering, testing and verification, operations, logistics, product assurance, and design-to-cost; Project Management Review propulsion; and safety and maintainability.	BACB-36526 PRD9. BE
85/09/12	This document contains the material presented at the CMR held at RI in Downey, California. It contains info on the following: Contract Management (schedule status, action item status); Technical Items (module pattern & airlock review, config study-response to SSCB, common module internal architecture, common module external I/Fs, assembly altitude, man-tended capability, function allocation- integrated system schematics, SSIS overview, & resource integration/ PMAD issues); Special Topics (TSIP Status, DP-2.3 Approach Discussion); Summary (CMS action items).	SS85-75
	This document is a monthly progress report for August 1985 regarding the SS Long-Term Lubrication Analysis. The task activities during this period included: development of work breakdown structure; identification of major moving mechanical assemblies; orientation briefing; and literature review. A description of each of these is given and significant problems are outlined.	BCD8-36655 PR3
	This document is a project management review for the SS Definition & Preliminary Design, WP-01. The report contains the following: summary of key project activities; TMIS; productivity status. The agenda for the review is also given, & these were the topics addressed in the document: project integration & SE; design engineering activities; operations engineering; ADP & technical activities summary; project status summary.	SSP-MMC-00013
85/09/13	Book No. 6, Vehicle Accommodations, of the SS Definition & Preliminary Design, WP-01 consists of Part I "DMV Accommodations and Servicing," and Part II	SSP-MMC-00012

85/09/13 "OTV Accommodations and Servicing" and the Appendix. Part I addresses the OMV accommodations for IOC; also included are the reqs, BL vehicle accommodations, cost analysis, equipment, summaries of trades & analyses, key decisions, & major issues & concerns. Part II addresses the Growth Vehicle Accommodations; also included are the reqs, BL vehicle accommodations, cost analysis, equipment, summaries of trades & analyses, key decisions & major issues & concerns. The Appendix provides the applicable trades & analyses.

The EMS Theme Data consists of 3 volumes. Each volume provides a summary for each of the EMS activities covered therein which delineates the status of studies & analyses relative to that theme & any recommendations that resulted therefrom. Each volume also contains a set of summary pages in viewgraph & facing page text format that expands & highlights key technical points of the effort that was conducted in satisfaction of the theme. Studies or analyses used as the basis for the theme satisfaction & the concomitant recommendation are included in full as well as back-up to that theme. Analyses of following are included in vol.1: CM, LM outfitting, LogM outfitting, reboost, alternative module outfitting approach, WP-01 element characterization, combined lab, time phase & analyze reqs for reboost & servicing, OMV (Smart Front End Req), materials processing, micro-g reqs, dual egress, distributed ECLSS, module isolation, reqs, & emergency definition & contamination study.

SSP-MMC-00012

SSP-MMC-00012

The EMS Theme Data consists of three volumes. Each volume provides a summary for each of the EMS activities covered therein which delineates the status of studies & analyses relative to that theme & any recommendations that resulted therefrom. Studies or analyses that were used as the basis for the theme satisfaction & the concomitant recommendation are included in full as back-up data to that theme. Volume 3 discusses Strategies & includes discussions of the following: define logistics items, quantities, frequency of need, storage on-orbit for up & down cargo; LM design analyses; module commonality analyses; module outfitting systems commonality analysis; and, define functional commonality candidates.

SSP-MMC-00012

This document is a MMA quarterly management review of activities in the SS Definition & Prelim Design, WP-01. The document includes the following: a status summary, advanced development/new technology, ops & logistics, CM integration simulation, CM approach & commonality summary. The achievements of this quarter include: RUR-2 data submission, completion of CM justification study, initiation of design/fabrication of CM integration, development of a recommended distributed CM subsys BL designs (DMS, Structures, TCS, ECLSS, communication), developed recommended P&VA BL designs including OMV smart front end options. Cost data are also discussed.

SSP-MMC-00017

This document is a monthly activity report for August 1985 regarding NASA-36526. This report is organized by module and functional manager. Significant program accomplishments during this period include: preparation of DR-19 data inputs for RUR-2 review; prepared End Item Data Documentation in conjunction with DR-19; supported MSFC in numerous meetings and data reviews; and Boeing space laboratories became operational on 29 August 1985.

2-B291-0020-057

This document is an appendix to Book 2 of the SS Definition & Prelim Design End Item Data Book and it deals with CM trades & analyses. The following

SSP-MMC-00012

DATE	ABSTRACT	ID NO.
85/09/13	are dealt with herein: CM system, S/Ms, EPS, DMS, communications, ECLSS, TCS, S/W.	
	This document is an executive summary of the SS Definition and Prelim Design RUR-2 DP 1.2 study. The following 4 parts comprise the document: Part 1 (reboost/ops; Shuttle assumption/approach; reference config/flight mode; LogM); Part 2 (altitude ops/assembly; module length; module pattern/ module interconnect; airlock location; dual egress reqs); Part 3 (degree of ECLSS closure; module pressure; distributed ECLSS); and Part 4 (micro-g customer reqs; hatch size; propellant storage; module outfitting/ alternate outfitting). A summary of recommendations is also included.	SSP-MMC-00012
	This document is Book 2 (Common Module) of the RUR-2 DP 1.2 End Item Data Book. Provided is a definition & description of the current MMA-recommended SS WP-01 config. Table-1 is a top level summary of this config & includes all WP-01 elements. The config is based on a modified twin-keel power tower with horizontal 4 module race track integral berthing module pattern. Book 2 deals with the following: reqs; config; subsys (S/M, EPS, DMS, communications, ECLSS, TCS, crew sys, s/w. Appendices include discussions of CM sys, S/Ms, EPS, DMS, communications, ECLSS, TCS, s/w.	SSP-MMC-00012
	This document is Book 3 of the document which provides a definition & description of the current MMA-recommended SS WP-01 config; Book 3 deals with the MTL. The MTL design presented differs slightly from the config presented in Table-1. The differences are in CM configs, operating altitude, & recommended Shuttle performance. This book provides an MTL outfitting design based on a 44-ft long CM with the floor & ceiling locations in MMA Phase B proposal. Req, config, MTL subsys config/performance, CA, trades & analyses, and major issues & concerns are all discussed in the document.	SSP-MMC-00012
	This document is Book 4 (dealing with LogM) of the SS Definition and Prelim Design End Item Data Book. The entire Data Book provides a definition & description of the current MMA recommended WP-01 config. The LogM is a combined pressurized & unpressurized structure derived from CM elements. The following are dealt with in the document: reqs, config, subsys, CA, sys trades & analyses, major issues & concerns.	SSP-MMC-00012
	This document provides the current status & results of studies performed for MSFC under contract NAS8-36526 WP-01 of SSP Definition & Prelim Design. The data contained herein are organized according to NASA Level C EMS & consists of EMS items deemed by MSFC to be priority 1 issues for RUR-2. The purpose of DR-19 is to provide a progressive build-up of coordinated data, leading to the prelim design of manned or MTA SS. This is volume 2 (Configs) of the EMS Theme Data Book, & it is divided into 3 volumes: Req, Configs, & Strategies. This document is organized with a summary sheet for each EMS product with backup material following each summary sheet. Topics discussed include: commonality, customer reqs, logistics, module pattern/size, ops reqs, safety, Shuttle performance.	D483-50021
		D483-50021
	This document provides the current status & results of studies performed for NAS8-36526 WP-01 of SSP Definition & Prelim Design. This is Volume 1 (Requirements) of the EMS Theme Data Book. The book is divided into 3 volumes	D483-50021

85/09/13 and this volume deals with reqs. The following are considered: Shuttle performance capability & SSP implications (analyses of CM, LM, LogM, Reboost, alternate Module outfitting approach, combined lab); SS ops reqs (time phased & analyzed ops reqs); customer reqs (including DMV, MTL, microgravity); safety (including dual egress reqs, distributed ECLSS, module isolation, emergency definition & containment)

This end item data book provides a definition & description of the current MMA-recommended SS WP-01 config. Table-1 gives a top level summary of this config & includes all WP-01 elements. The SS config considered is a modified twin-keel power tower with horizontal 4-module race track integral berthing module pattern. The recommended WP-01 config description is divided into 6 volumes; Book 1 deals with SS Systems. The following topics are considered therein: reqs; configs (IOC, growth, man-tended, & international); special systems topics (Shuttle performance, weight, s/w, mockups, T&V, ops, A&R, MTA, evolution); systems trades & analyses; major issues & concerns.

SSP-MMC-00012

SSP-MMC-00012

This is volume 2 of the EMS Theme Data which provides a summary for each of the EMS activities covered therein which delineate the status of studies & analyses relative to that theme & any recommendations that resulted therefrom. Each volume contains a set of summary pages in viewgraph & facing page text format that expands & highlights the key technical points of the effort that was conducted in satisfaction of the theme. Volume 2 (Configuration) deals with the following: module pattern analysis; airlock location analysis; internal traffic analysis including isolation; number of modules analysis.

SSP-MMC-00012

This status report for the period 3 August through 30 August 1985 describes the progress on the Propulsion Technology Program, NAS8-36418. The objectives of this program are to provide a demonstration of hydrogen/oxygen propulsion technology readiness for IOC Station application, namely gaseous hydrogen/oxygen and warm hydrogen thruster concepts, and to establish a means to evolve from the IOC Propulsion System to that required to support advanced Space Station functions. Major accomplishments during this reporting period are the release of the structure procurement, the valve procurement, connector and line procurement, and the satisfactory completion of the informal preliminary design review.

85RC13231

85/09/15 This document is prepared for MSFC in response to NAS8-36525 & is submitted in accordance with DR-14, Monthly Status Report for the reporting period of 8/1/85 through 8/31/85. This is the fourth Monthly Status Report and it provides a summary of MMA activities in support of MSFC SSP. The major MMA effort during this period was directed toward analyses which support RUR-2. Major MSFC support activities were as follows: provided data & support to selection of priority decisions & EMS theme activities for RUR-2; recommend RUR-2 DP architecture to MSFC & participated in final selection process; placed MMA management emphasis on EMS priority one data preparation for DRI.2.

SSP-MMC-00006

This is the fourth monthly status report submitted by MMA in accordance with the reqs of DR-14. This report provides a summary of MMA activities in support of MSFC SS activities. The major activities during the period include: provide data & support to selection of priority decisions & EMS theme activities for RUR-2; recommend RUR-2 DP architecture to MSFC &

SSP-MMC-00006

DATE	ABSTRACT	ID NO.
85/09/15	participated in final selection process; placed MMA management emphasis on EMS priority-one data preparation for DR1.2. CM, LogM, MTL, P&VA, ADP, FO, logistics/maintainability, TMIS, and productivity are also discussed herein.	
85/09/16	This document is a monthly progress report for the ARBC study for August 1985. The following tasks were emphasized during July: 1) installation & manipulation of SS NASTRAN structural model on FACC computer sys; 2) continued analysis of state-space & transfer function models of the SS-derived from the NASTRAN structural model; 3) presentation of preliminary results & attendance at SS GN&C TIP Meeting, 7/30/1/85 at MSFC; 4) definition of attitude pointing and P/L stability reqs for the ARBC study; and, 5) preparation of the detailed 2-year study plan.	FACCB-36422 FR2
	This study is to perform several tasks to define & plan a STD for operation on the SS. This first monthly report focuses on program initiation & the beginning of Task I. Task I is to identify a set of instruments that will comprise the STD that will fly on the IOC SS, to determine the reqs of placing instruments on STD, & to evaluate the operating conditions for SS.	TSWB-36603 MR1
	This third monthly progress report presents a description of program activities at UT-HS during the period of 8/1-9/1/85 in performing the SS LLFS program. The basic objectives of this program are to evaluate the complex issues associated with SS LLFSs, generate workable design configs which satisfy LLFS reqs, & manufacture test h/w suitable for evaluating & demonstrating maintenance technologies. The following significant events were accomplished during this period: completed definitions of composite schematics; continued definition of critical components & instrumentation. Anticipated accomplishments for the next period are also outlined.	HSB-36626 MPR3
85/09/18	This report describes the study by HAC of SS A&R in the areas of subsys control & mission ops. The objective of the SS A&R study is to provide input to NASA for the identification of promising A&R technologies that can enhance SS ops. The focus of the study included the following SS subsystems: 1) EPS; 2) TCS, & 3) communications. Conclusions are also discussed.	HAC-82-14F FR
85/09/20	The On-Orbit Maintenance Operations Plan is the BL for in-flight operational maintenance, and includes reqs for flight system maintainability design, development, & operations. This document establishes on-orbit maintenance concepts, guidelines & reqs for the development of the plan. The on-orbit maintenance program will provide maintenance for the MTC & the PMC SSs.	SSS85-0208
	This document is a report which describes the structure of the EVA Mission Req Data Base Study, the methodology used, & the types of reports that can be generated by the data base. 28 missions, representing 561 EVA hours have been analyzed & entered into the data base. The definition of an EVA system is to be conceptualized in terms of safety, productivity, & cost effectiveness. The intent of the project is to design an EVA mission data base that will provide support to the various SS & SS-related work efforts. This report also describes the type of reports that can be generated by the data base.	SSS85-0082
	This document is of the WP-3 series and discusses integration assessment. The following issues concerning lab module outfitting are discussed: horizontal flight mode, dual keel, module pattern, module length, lab configuration, & centrifuge location.	WP3-EMS-C1.3.2

85/09/20 This document is the initial report planned for the Interior Architecture study conducted within Grumman's manned Space Systems Habitability IR&D Project. The overall objective of this study, & consequently the subject of this document, is to develop guidelines & design criteria for SS habitat modules by focusing on the 3 related functional disciplines: human factors, interior architecture, & crew support. The results of the Interior Architecture & Habitation Module Mockup & Model activity are reported herein. The initial six interior concepts are described & the reasons for selection of the 3 most promising are given. Early model activity is described: the further definition of the two mockup candidates is reviewed & the mockup plans & construction status are given.

SSS85-0083

This document provides a viewgraph summary of the following: 1) preliminary platform resource req; 2) interim science lab module req; 3) interim customer servicing resource req; and, 4) interim attached payload resource req. Platform power req (design envelope), platform interfaces w/SSPE, platform resource req summary, SLM resource req, & attached P/Ls resource requirements are also included.

EMS R3.3.1

This document takes a Lab Module Analysis and Lab Outfitting as its EMS item. The tasks to be performed as outlined in this document are: provide an analysis of constraints/benefits to SLM design & operations due to use of STS during all mission phases (launch operations, on-orbit deployment & checkout, STS crew availability, orbit parameters, & SS buildup) and to define alternate concepts for the design & operations of the SLM which will alleviate one or more of the constraints imposed by use of STS & maximize benefits derived from STS. Typical considerations include: varying size, mass, & configuration; equipment complement; on-orbit assembly & integration; launch configuration; and, launch full, empty, half full, etc. Included are Primary Structure Characteristics, Common Module Equipment Characteristics, SS Equipment in SLM, SLM characteristics, and other data provided by RCA, LMSC, BASD, & CSC.

WP3-EMS-R1.3.1/1.2

This document takes as its EMS item to Define Scars for Growth A&R. The purpose of this task is to provide recommendations for candidate system or subsystem-level Station functions suitable for automating or performing by telerobotics during SS growth (i.e., post-IOC). Also it should address those functions yielding benefits during SS operation, both ground & on-orbit, for which suitable technologies will achieve maturity at some point during the operating life of the SS and identify associated hardware & software features (scars & hooks) that should be provided in the IOC SS to facilitate the later incorporation of the technologies required to automate the recommended functions. Findings are presented for all projects (e.g., symbolic processors, fault tolerant systems, & distributed processing), SLM, and servicing.

WP3-EMS-S2.3.4

This document takes as its EMS item to Define Selection Criteria. This process involves the identification and definition of criteria to be used in the selection of recommended automation candidates & technologies applicable to automating those functions. It also is to characterize each criterion according to its importance as a decision attribute in the selection & assessment of functions & technologies recommended for SS automation. Selection criteria include the following: crew productivity; safety; DDT&E costs; growth; spin-off; mission reliability; and, crew confidence. The evaluation approach involved the following: cost/benefit analysis; quantification of qualitative attributes; and, optimized analysis for application area.

WP3-EMS-S2.3.2

DATE	ABSTRACT	ID NO.
85/09/20	This document takes Attached Payloads Safety Requirements as its EMS item. The purpose of this task is to identify threats to the safety or integrity of attached P/Ls resulting from SS operations, to identify threats to the SS or crew resulting from the presence or operation of attached P/Ls, or to define the requirements that eliminate or control these threats. Input from RCA & GE was used.	WP3-EMS-R6.3.7
	This document takes Element Characterization for Operating Altitude Study as its EMS item. This is also related to physical characteristics & launch packaging alternatives for attached P/Ls & externally mounted P/L Attach Equipment. STS and DMV performance capability for co-orbiting SPs is also defined. RCA & GE findings are given for their efforts concerning the above.	WP3-EMS-R1.3.5
	This document takes IOC Preparation and Update Platform as its EMS item. This document specifically gives an assessment of the PIP which outlines the management roles & responsibilities & provides a definition of the technical activities, interfaces, & schedule req to accomplish the integration, launch, deployment, & servicing of the SSPEs with the STS. The assessment includes 1) a review of the PIP's scope; 2) an examination of the current PIP for discrepancies; and, 3) a discussion of the PIP's appendices in terms of their early resolution.	WP3-EMS-R1.3.6
	This document takes Reboost Analysis Constraints as its EMS item. The objective of the task was to evaluate the user's (p/l & SLM) req from the standpoint of their req constraining the firing of the thrusters. These restrictions include micro-gravity disturbances, accelerations over the period of thrusting, and experiment downtime due to thrusting. Alternatives to minimize thrusting procedures, such as continuous thrusting versus scheduled reboost thrusting, were considered. RCA & GE findings concerning the above are listed for the following topics: attached p/l's and co-orbiting & polar SPs.	WP3-EMS-S1.3.4
	This document takes Select A&R Technology Candidates as its EMS item. The objective of this task is to identify advanced technologies of particular importance to the functions recommended for automation at IOC, using recent SS-related A&R technology assessments as the BL. It also is to assess the identified technologies according to cost, safety impact, maintainability, and development required to minimize availability risk. The A&R technology candidates considered are SLM, SPs, servicing, & attached P/Ls.	WP3-EMS-S2.3.3
	This document takes the following as its EMS item: Define Ground Accommodations and Storage. The goal of this task is to identify ground accommodation handling & processing equipment, ground storage environment (storage volume, weight, center of gravity, specialized containers, etc.), & security precautions. Also it is to identify special requirements for ground personnel training, special transportation needs, or special preparations for loading into the logistics module prior to flight. An attachment contains the WP-3 SSP WP-3 Integrated Logistics Plan.	WP3-EMS-S3.3.3
	This document takes the following as its EMS item: Define Logistics Items, Quantities, Frequency of Need, Storage On-Orbit, for Up and Down Cargo. The purpose of this task is to identify & quantify logistics requirements throughout the life of the SS. In particular, to identify & quantify the gases, fluids, & solids necessary for the servicing & maintenance of the SS & its P/Ls, and the clothing, nourishment, & life support of the crew. Each WP element, international partner, & customer will identify its needed frequency of	WP3-EMS-S7.3.1

85/09/20 resupply; this info will contribute toward an accurate manifest (both up & down cargo) for the Logistics Module. Storage requirements & environment constraints at the SS are to be identified. The following logistics items are to be defined: ORUs; consumables (cryogenics, propellants, etc.); waste (feces, paper, etc.); experiments; p/l's; & hard data (film, magtape).

This document takes the following as its EMS item: Define Sparing Approach. The purpose of this task is to define a sparing approach which will provide an operational, supportable inventory beginning at IOC and to insure that each sparing approach is consistent with a maintenance concept. Also it is to identify limited life items and to recommend maximum & minimum quantities for spares and a minimum initial provisioning period.

WP3-EMS-S3.3.2

This document takes the following as its EMS item: Module Commonality Analysis. The purpose of this task is to identify items of hardware &/or software which are either part of or contained within a module/element which could be determined to have characteristics which are common with similar items elsewhere in the same of other modules/elements. Also a list of those items and their characteristics is to be provided.

WP3-EMS-S4.3.1

This document takes the following as its EMS item: verification and checkout. The definition of this task is as follows: to identify inter-WP verification activities and the facilities needed to accomplish them. Also discussed: ground verification activities analysis; tests for SLM outfitting; ground vs on-orbit verification trades; test vs. analysis trades; protoflight vs prototype verification; growth verification approach; verification envelope definition; bite and instrumentation analysis; ground check-out requirements analysis; ground vs. on-orbit checkout trades.

WP3-EMS-S6.3

This EMS document concerns itself with growth requirements. The different themes encompassed are the SLM, attached P/Ls, platforms, and servicing. Growth increments and limits definition are given for each of the themes, as are growth requirements and a concepts analysis.

WP3-EMS-C2.3.1.7

This EMS document describes a task with the objective of providing preliminary functional allocation information to other WPs. This includes providing tabular listing of functions to be performed by the WP-3 program elements: attached payloads, SLM, platforms, servicing, and SSIS. A section is devoted to defining the interfaces between subsystems on the SP, between the SP & other WPs, and between the platform and other SSPEs.

WP3-EMS-C6.3.1.4

This EMS document is to define a study which will in turn define the selection criteria for platform power options. The document lists the issues to be covered in the compiling criteria: cost, launch requirements, operational requirements, servicing, customer accommodations, impact on other subsystems, and other constraints. Under each of these issues, the document provides sub-issues to be considered as well.

WP3-EMS-C5.3.1.2

This EMS document takes Attached Payloads Pointing Requirements Analysis as its item. The purpose of the task is to categorize the pointing req for the attached p/l set found in the MRDB. The objective of this analysis is to provide an envelope of the pointing req which will be essential in the conceptual design of Payload Attachment Equipment. A list of Attached Payloads Pointing Performance Definitions is included.

WP3-EMS-R5.3.4

DATE	ABSTRACT	ID NO.
85/09/20	This EMS document takes for its task to evaluate the impact of alternative module patterns on the SLM, to propose acceptable patterns, and to consider airlock placement, traffic, isolation (mechanical & biological), growth, resource distribution. Also it defines internal traffic in the SLM resulting from alternative module patterns. It is also to determine the impact of module pattern on isolation requirements and to conduct analyses of the number of modules & of airlock location.	WP3-EMS-03.3.1
	This WP-02 document is part of a 6-volume submittal in response to DR-19, DP-2.3. This is volume I and it contains an executive summary of the entire study report and also other information in 2 sections of the document. Configuration is a topic considered; the definition of an overall config for SS is a task of primary importance. These topics are covered under config: truss construction, airlock location, optimization, module interconnect, module pattern, microgravity, & alternate configs. DMS section contains the results of trade studies & analyses directed at the definition of the SS DMS. This design update continues by stepping down to the specific component parts of the DMS system & developing specific architecture design. The DMS elements considered are network, processing, storage, data presentation & entry, data handling, & time frequency.	SSS85-0162
	This WP-02 document is volume 3 of a 6-volume submittal; it deals specifically with structures, thermal, control, assembly sequence, & resource integration. Under structures, these were objectives: to ensure that adequate separation exists, to determine pointing errors & rates, to determine g-levels, to calculate loads at different parts of the SS.	SSS85-0162
	This WP-02 document is Volume II of a 6-volume submittal in response to DR-19, DP-2.3. Volume II gives a C&T Architectural Analysis. The primary emphasis for the C&T segment is to report on the status of the initial trade studies which addressed the fundamental issues before performing the detailed implementation trades. Reporting on the trade studies begins w/the higher level end-to-end communications architecture; it includes studies on space to ground & ground to ground communications, & a sys performance analysis. A C&T reference design has been designed. The C&T was partitioned into 7 subsys to facilitate trade activities: MRMS-NSTS-SS Communications; Multiple Access Communications; TDRSS Communications; Video; Audio, Control & Monitor; and, Tracking.	SSS85-0162
	This WP-02 document is volume IV of a 6-volume submittal. This volume deals with the following topics of discussion: Structures- Truss configuration, resource modules, airlocks, pressurized module interconnect, flexible tunnel configuration, mechanical design, rotary joints, manipulators, docking/berthing, mechanisms; HM outfitting analysis; Airlock outfitting analysis- airlock outfitting, airlock gas management; Design-to-Cost methodology & Preliminary Implementation approach.	SSS85-0162
	This WP-02 document is volume V of a 6-volume submittal. The following is a list of topics discussed herein: SSIS, System Sizing, & Reqs Definition; End-to-End Information Flow Preliminary Definition; Man-machine Interface/User Engineering; On-Station Configuration Preliminary Definition; On-Station Management Preliminary Functional Definition; Ground Segment Preliminary Definition/Recommendations; SSIS Operational Scenarios.	SSS85-0162
	This WP-04 EMS document concerns itself w/STS Performance Capabilities	RUF2-4EMS-R1-4.1

DATE	ABSTRACT	ID NO.
85/09/20	<p>& SS Implications and its EMS item is EPS Characteristics re Altitude. The objective of this EMS item is to provide information about the EPS that will help define the optimum operating altitude. Also provided will be the mass & the volume of EPS elements packaged for launch. For the deployed EPS, mass, area, dimensions, and center-of-mass data will be provided to assist orbit decay & reboost calculations.</p>	
	<p>This WP-04 EMS document contains 9 sections concerning the subject of verification/checkout. The overall purpose of the effort discussed herein is: a) to incorporate a Ground Verification Activities/Analysis philosophy into the Level B effort; b) to increase the likelihood that the risk associated w/the test & verification program can be minimized through early, thoughtful planning; and c) to identify, through trade studies, reference concepts that have potentially high test/verification program risk. The following are the sections: S6.4.1: Ground Verification Activities; S6.4.2: Ground vs On-Orbit Verification trades; S6.4.3: Test vs Analysis trades; S6.4.4: Protoflight vs Prototype verification; S6.4.5: Growth Verification Approach; S6.4.6: Verification Envelope Definition; S6.4.7: BITE & Instrumentation; S6.4.8: Ground checkout Reqs; and, S6.4.9: Verification & Checkout. A later issue of this document is also on-file by the same number.</p>	RUR2-4EMS-S6.4.1
	<p>This WP-04 EMS document deals w/function allocation. Its EMS item is Allocation Criteria. The objective of this EMS item is to develop a set of criteria to be used to decide the location of a piece of equipment that performs a certain function. This submission supplies the up-to-date definition of WF-04 h/w characteristics w/in each subsys.</p>	RUR2-4EMS-C6.4.2
	<p>This WP-04 EMS document deals with function allocation and it takes as its EMS item "Allocation recommendations." The objective of this EMS item is to update the config drawings & location recommendations. The objective of this submission is to draw attention to the recommendation architectural drawings found in EMS submission C1 Architectural Concepts.</p>	RUR2-4EMS-C6.4.3
	<p>This WP-04 EMS document has as its EMS item the following: Define logistics items, quantities, frequency of need, & on-orbit storage for up & down cargo. The objective of this EMS item is to: identify resupply items for consumables, replacements, to identify down cargo items for materials, waste products, replacements, identify items required for on-orbit storage, identify frequency of need for up-down cargo items, control/tracking of consumables & replacement items, and recommend an approach. The objective of this submission is to identify resupply items for consumables, replacements, identify the overall mass & volume of down cargo items for replacements, identify the number & overall mass & volume of items required for on-orbit storage, and to identify frequency of need for up-down cargo items.</p>	RUR2-4EMS-S7.4.1
	<p>This WP-04 EMS document is divided into 2 sections. The first section has Module Commonality Analysis as its EMS item. The purpose of this EMS item is to determine the optimum application of common EPS items (components, s/w, etc.) to the common module. The second section has SP Commonality Analysis as its EMS item. Summary data are given concerning the topic.</p>	RUR2-4EMS-S4.4.1
	<p>This WP-04 EMS document takes as its EMS item "Provide OPS Reqs to other WPS & Level B." The objective is to provide the power sys ops information that is needed to assess the operability of the SS. This is accomplished by a)</p>	RUR2-4EMS-R2.4.1

95/09/20 providing information about the EPS in the areas of reboost, assembly, proxops, EVA/IVA, autonomy, & maintenance; and b) providing comments on the Level B "Space Station Flight Ops Description & Design Criteria." For objective (a) this submission includes information previously submitted in the areas of reboost, assembly, proximate ops, & EVA/IVA. New information is provided concerning autonomy, and the section on maintenance has been revised & expanded. For objective (b) comments already submitted to the Operations Panel are recorded.

This WP-04 EMS document takes as its EMS theme "Customer Accommodations" and "Special Accommodations" for its EMS item. The purpose of this task is to provide feedback to the customer specifically to inform him as to how the power sys can meet his needs. At this point, the customer may appeal to higher authority or modify the reqs in Task R3.4.1. Information provided in this task should include a definition of the characteristics & quality of the power the customer would be provided for P/Ls attached to the SS as well as SPs. Electrical parameters described include: 1) average power; 2) peak power; 3) voltage; 4) current; 5) power quality; 6) special physical or thermal interfaces; 7) control reqs (priority); and, 8) data provisions.

RUR2-4EMS-C4.4.1

This WP-04 EMS document takes for its EMS item "Effect of IOC Power System Options on Growth." The objective of this task was to assess the impact of power sys options on the growth SS & SP architectures & also assess the impact of these architectures on the growth power sys options. The objective of this submission is to assess the relative impacts for the approved architectures and the approved power sys options. The approved architectures are the power tower for the SS and the RFP version for the SP. The approved power sys options for the SS are PV & SD.

RUR2-4EMS-C.1.4.3

This WP-04 EMS item deals w/Power Sys Assessment. The objective of this EMS item is to assess the impact of power sys options on the SS & SP architectures & also assess the impact of these architectures on the power sys options. The objective of this document particularly is to assess the relative impacts for the approved architectures & the reference power sys configs. The approved architectures are the power tower for the SS, and the RFP version for the SP. The reference power configs are PV-RFC, SD-CRC, and SD-ORC for the SS and PV-NiCd for the SP.

RUR2-4EMS-C1.4.2

This WP-04 EMS theme document concerns itself with Growth Req's, Concepts, and Limits Analysis. The object of this item is to originate or collect concepts for growth of the SS power sys & to identify limitations to power sys growth. The growth concepts should satisfy identified reqs imposed by power sys or SS considerations. This submission presents a number of possible SS power sys growth paths for PV, SD, and hybrid power systems. The growth paths are considered from the point of view of physical arrangement and from the point of view of a sequence of module types. Possible SP growth paths are related to SS growth paths. The evaluation of the growth paths given here is part of EMS item C5.4.2.

RUR2-4EMS-C2.4.1

This WP-04 EMS theme document covers the following tasks: Define ORUs; Accessibility Studies; Special Tools Req's; Maintenance Analysis Including Time/Skills Req's; Fault Tolerance/Maintainability Analysis; and, On-Orbit vs Ground Repair. Each submission within the larger document has the following objective: ORU-to give an updated list of ORUs in the WP including weight/volume definition; Accessibility- to access openings tools usage, fast reachability;

RUR2-4EMS-SS.4

85/09/20 Special tools- give a description of function & reqs; Maintenance- to update crew time/skills required for ORU tasks, including EVA/IVA time; Fault Tolerance - to give updated maintainability approach, method of fault detection & ORU replacement; Repair- to give updated selection criteria for on-orbit vs ground repair, identification to the part level, give updated list of candidate items for on-orbit repair, to give cost analysis for ground/on-orbit repair trade.

This WP-04 EMS theme document is the second submission of the document numbered RUR2-4EMS-C1.4.3. Its subject is Effect on IOC Power System Options on Growth. The objective of this task is to assess the impact of power sys options on the growth SS & SP architectures & also assess the impact of these architectures on the growth power sys options. The objective of this submission is to assess the relative impacts for the approved architectures and the approved power sys options. The approved architectures are the power tower for the SS, and the RFP version for the SP. The approved power sys options for the SS are PV & SD.

RUR2-4EMS-C1.4.3

This WP-04 EMS theme document takes as its EMS item "Provide Resource Req's to other WPs & Level B." This task will provide the other WPs & Level B with the power sys resource reqs (for all power sys options) needed to assess the impact on other SS/SP subsystems. Resource reqs will cover the following areas: thermal, data, ECLSS, C&T/GN&C, EVA/IVA/personnel, volume, and fluids. The reqs for "emergency, contingency, safe haven" resources should also be included. This submission will define the overall resources required by the power sys in each resource area based on reference concepts & sys trade analyses completed by WP-04 to date. In some areas, significant data are not yet available.

RUR2-4EMS-R3.4.2

This WP-04 EMS theme document takes EPS Launch Packaging as its EMS item. The objective of this EMS item is to provide mass, center of mass, & dimensions of the packaged elements of the EPS. This information will enable Level B to identify bookkeeping overlaps b/w the WP centers & to proceed with STS payload bay integration studies. In the document services & special needs are listed that the EPS will require before & during launch & for assembly on orbit; these are found in the Supporting Data Section for each EPS subsystem.

RUR2-4EMS-R1.4.2

This WP-04 EMS theme document takes for its EMS item the following: Inputs to Redundant Control Station Study. The objective of this EMS item is to identify the reqs for a redundant control capability, identify the design options which provide the capability, and assess & evaluate the design & cost impacts of a redundant control capability. The following is a topic related to EPS & is discussed in this document: accommodation of control systems failure through redundant components, without crew intervention, to provide a fail-op/fail-safe/restorable capability.

RUR2-4EMS-R6.4.5

85/09/26 This document is a compilation of briefing material used by RCA Astro-Electronics at a WP-03 Management Meeting with GSFC officials on 9/26/85. The document provides a status report of study activities up to that point in time. Highlights are given for payload/accommodations, CS, SLM, and SPs. Also given is A Data Proposal.

RCA-DR13-3

This document is a progress report of activities of the Body Mounted Radiator (BMR) Systems study. The following activities were engaged in during this period: module locations were defined and documented for freezer locations;

3-14000/5R-67B

DATE	ABSTRACT	ID NO.
85/09/26	<p>heat transport systems were defined and comparisons generated; work was begun on concept definition and evaluation criteria. Longitudinal and circumferential BMR locations are given. Diagrams are provided which show locations of BMRs at both the longitudinal and circumferential specifications. A program schedule and a chart showing engineering labor hours are provided.</p> <p>This document is presentation material designed to accompany a GE/TRW monthly status report. The following major topics are covered in the document: platforms & servicing, attached payloads accommodation, SE&I, laboratory outfitting, SSIS, operations, and ROM cost estimate plans.</p>	GSFC-WP3-MSRM
85/09/30	<p>This is an USRA monthly progress report regarding SS natural environment design criteria. The period of the report runs from 9/1/85 - 9/30/85. The revision of TM-8649 and planning for the November workshop on the neutral & upper atmosphere models and user needs were the major topics of study in this reporting period.</p> <p>This WP-04 EMS theme document concerns EMS item "Emergency Definition & Containment." The objectives of this item are to identify power sys hazards that require control or containment, to identify the control & display reqs for each condition, to develop criteria to avoid, eliminate, or control these failure modes, & emergencies, and to develop definition of safety philosophy for the power sys. The objectives of this particular submission are to identify power sys hazards & emergencies that require control or containment and to develop the definition of the safety philosophy for the power sys.</p> <p>This WP-04 EMS theme document takes as its EMS item "Emergency Definition and Containment." The objective of this EMS item is to identify power sys hazards & emergencies that require control or containment, to identify the control & display reqs for each condition, to develop criteria to avoid, eliminate or control these failure modes & emergencies, and to develop definition of safety philosophy for the power sys. The objective of this submission is to identify power sys hazards and emergencies that require control or containment and to develop a definition of safety philosophy for the power system.</p>	USRA8-36406 PR3
85/10/01	<p>This document contains "Activity Descriptions" of the 20 themes which comprise the SS EMS. The 20 themes are supposed to cover the major activities which set the course for all other Phase B activities. A "Theme description" will define the context for each Theme within the EMS. The following are the 20 EMS themes: 1)STS Performance Capabilities & SSP Implications; 2)SS Operations Req; 3)Resource Req; 4)DTC; 5)Customer Reqs; 6)Safety; 7)Standards; 8)Architectural concepts; 9)Growth theme; 10)Module Pattern/Size; 11)CA; 12)Power Option; 13)Function Allocations; 14)Advanced Development; 15)A&R; 16)Logistics; 17)Commonality; 18)Maintainability; 19)Verification; &, 20)International Participation. This document contains an update version of the EMS dictionary and a copy of the original with hand-written changes shown.</p> <p>This document defines the development sys which is structured to prove concept & to allow user exercise of the lab sys to confirm application to the SS common module of the Module Audio Distribution Development System. Included is a description of the key components and a functional description of the System. Demonstration reqs are explained. Also included is the Audio Control Unit parts list.</p>	ENS-DICTIONARY
		HAC8-36430 DP

DATE	ABSTRACT	ID NO.
85/10/01	This document is a progress report for September 1985 of the Space Station Power System Network Topology and Hardware Development Program. The following areas received attention during this month: requirements definition; the loads data base; conceptual network layout; and network concept selection. The objectives for October 1985 were also listed.	MCR-85-618-4
	This document is a report which discusses the Systems Analysis Study of the Space Platform and Space Station accommodations for the Life Sciences Research Facilities. The report is multi-volumed and discusses conceptual design and programatics. The three major study objectives were: to update requirements and tradeoffs and develop a detailed design and mission requirements document; to develop conceptual designs and mission descriptions; and to develop programatics (i.e., work breakdown structure and dictionary, estimated cost, and implementing plans/schedules) as they relate to the life sciences. Missions, requirements, and conceptual design, critical issues, technology issues, and programatics are discussed.	D180-27863-1
	This document is Book 1 of a 2-book set which deals with 20 major program themes. Book 1 covers the following: 1)STS Performance capabilities & SS implications (operating altitude variation,HMD,alternate module outfitting, element characterization,PIP, personnel transportation, reboost); 2)SS ops reqs; 3)resource reqs; 4)DTC; 5)Customer reqs (customer resource reqs, AP reqs, pointing reqs, micro-g reqs); 6)safety (dual egress, ECLSS, module isolation, containment, redundancy control, rescue, AP safety reqs, C&W, servicing safety); and, 7)Standards development. Each EMS theme task discussion is preceded by a section which describes objectives, key assumptions, results/conclusions, and recommendations for that task.	MDC-H2010
	This document is Book 2 of a 2-book set which discusses 20 major EMS program themes. Book 1 discussed themes 1-7 and this book discusses 8-20: 8) Architectural concepts (options, cost); 9)growth analyses (limits, scar); 10) module pattern/size (airlock location, internal traffic/isolation, number of modules); 11) CA; 12) power option; 13) function allocation; 14) ADP; 15) A&R; 16) logistics; 17) commonality (module, SS-SP, module outfitting, selection criteria, functional candidates, GSE); 18) maintainability; 19) verification & checkout; and, 20) international participation.	MDC-H2010
	This document is the final report on the design & development phase of the EVA Radio advanced development project. It includes individual reports on the following subtasks of the design/development phase: Trade Studies & Analysis, Architecture Description, & Breadboard Design & Lab Test. The subject of this report is EVA communications, which is part of the Multiaccess Subsystems. A major component of the EVA communication link is the receiver/transmitter (R/T) unit which operates in the 13.4 - 15.2 GHz band. The objective of this program is to design, fabricate, & test a single-channel proof-of-concept breadboard of the R/T unit.	MDC-02-300-20-16
	This document is the first Thermal Utility Bus Control Advanced Development task milestone report. The study was made for 3 nominal bus temperature levels as initially envisioned, 35deg F, 70deg F, and 90deg F, with evaluation of transferring the 90F bus loads to the 70F bus and thereby eliminating the 90F bus. The selection of the nominal bus temperatures was based upon groupings of attached & module p/l's according to their operating temperature reqs. This document contains a discussion of the bus temperature	MDC-02-300-20-07

85/10/01 limits & problems with p/l temperature limits, the rationale for the selected limits, and development of the control reqs in relation to bus characteristics. The commonly stated criterion of 9F (5C) for bus isothermality or control bandwidth is adopted as a control req.

This document is the September 1985 monthly progress report in the ECLSS Integration Analysis Project. The progress report includes the following: a) quantitative description of work performed during the work period; b) summary of work planned for the next reporting period; c) summary of problems/concerns; d) summary of manpower expended in current month, cumulative manpower expenditures to date, estimate of physical completion of contract, & explanation of significant variances. The following items were accomplished during this period: simplified General Cluster Model; detailed consumables model; oxygen recovery model; water recovery model; single-phase TC; BMR; H/W procurement; cluster equipment cooling; air temperature control & flow distribution.

MDC W5039-5

This document is Volume II of the report on the System Analysis Study of the Space Platform and Space Station Accommodations for Life Sciences Research Facility (LSRF). A summary of the findings of a study looking at conceptual design and programmatic is given. The following are also examined as they relate to LSRF: engineering and mission design requirements; mission transition analysis; major trade analysis; concept development and evaluation; and programmatic.

D180-27863-2

This document takes Dual Egress Requirement/Impact Study for its EMS item. The purpose of the task is to define the dual EGRESS requirements of SLM relative to safety & to define the impacts of providing dual EGRESS within the SLM on both configurations (module pattern, airlock placement) as well as the impacts on the internal equipment (e.g., centrifuge configuration & placement). The document lists the significant impacts of dual EGRESS in relation to module pattern & internal configuration.

WP3-EMS-R6.3.1

This document takes Inputs to Distributed ECLSS Study as its EMS item. The purpose of this task is to provide results to WP-1 which consider the need & degree of ECLSS distribution, and how this impacts the SLM. It also considers bioisolation, isolation of potential contaminants for crew health/safety, as well as isolation for experiment subject protection. Specific topics discussed include: inputs to distributed ECLSS study, atmospheric control, water management, and, waste management. A summary is also provided.

WP3-EMS-R6.3.4

This document takes the Emergency Definition and Containment Study as its EMS item. The purpose of this task is to define SLM & Customer Equipment and failure modes which could lead to emergencies that may threaten the safety of the crew. Also it is to define plans for containment and/or for assuring crew safety, to describe hazards that face the SS, i.e., strong magnetic fields, large volumes filled w/dangerous fluids, etc., and to describe the hazard from possible failures in either the payloads or WP-3 designs. It will include normal use installation and maintenance. The document includes a SS SLM Crew Safety Hazard List (e.g., fire, leakage, radiation, debris, etc.). Hazard are defined according to their impact: 1) impact on crew; 2) impact on SS integrity; 3) impact on SLM integrity; and, 4) impact on experiments. Hazard areas for attached P/Ls are also discussed.

WP3-EMS-R6.3.3

This document takes the Inputs to Redundant Control Station Study as

WP3-EMS-R6.3.5

85/10/01 its EMS item. The purpose of the document is to provide inputs to the redundant control station study and to assess the SLM module work station, servicing benches, and astrophysics attached P/L control station for suitability. Also it is to determine which SLM functions should be monitored by SS control station & to identify to WP-2 attached P/Ls redundant systems and hardware that are needed to insure crew safety and the hazards associated with redundant items.

This document takes the Inputs to Rescue Requirements and Timing Study as its EMS item. The purpose of the task is to define rescue requirements in terms of time constraints, access to SLM personnel, special req/procedures due to hostile environment, settling SLM equipment status, establishing conditions to permit return, etc., and to provide critique module pattern options with respect to rescue. Also considered are the Time Constraints Associated with Rescue Requirements.

WP3-EMS-R6.3.6

This fourth monthly progress report presents a description of program activities at UT-HS during the period of 9/1-10/1/85 in performing the SS LLFS program. The basic objectives of this program are to evaluate the complex issues associated with SS LLFS, generate workable design configs which satisfy LLFS reqs, & manufacture test h/w suitable for evaluating & demonstrating maintenance technology. Accomplishments during this period include: completed definition of critical components & instrumentation; continued maintenance reqs & methods study; initiated flight application assessment; submitted Systems & Critical Components Definition Study Effort Results; conducted program review meeting with NASA Technical Monitor.

HSB-36626 MPR4

This report summarizes the work accomplished in the Integrated Wall Design and Penetration Damage Control study during September 1985. The objectives of this contract are: 1) to develop an integrated module wall design for the Common Module that will meet requirements for internal pressure, launch and berthing loads, meteoroid and space debris environment and thermal radiators and 2) to develop a penetration control plan to assess the effects of primary wall penetration and for module repair/replacement following impact. Progress is described for analysis methods regarding the environment (including debris flux and flux/velocity distribution) and penetration function (including hypervelocity).

BAC8-36426 PR4

This report summarizes the work accomplished under the Ground Test Article for Deployable Structure Systems contract. This program consisted of the manufacture, assembly, checkout, & delivery of a GTA representative of a prototype SS deployable structure building block. The contract ran from 2/27/84 thru 10/27/85. This report deals w/work accomplished during the 2nd phase of a 2-phase program to establish a technology readiness of deployable structures for large SPs. The objective was to verify & evaluate the structural & operational characteristics of the design developed in phase 1. Config definition, weight statement, operating constraints, operating procedure, deployment, & retraction are all considered in the document.

SSS 85-0164

85/10/02 This document is a monthly progress report for NAS8-36585, Rotary Joint Mechanisms Test Bed Operations for September 1985. Work performed during this period included: preparation for the Preliminary Design Review on 18 September; proof from control system analysis, through simulation, that the concept of using a load torque motor to generate solar power inertia torque on rotary test actuator is a viable approach for load testing the actuator. Work to

CE8-36585 PR4

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ABSTRACT

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85/10/02 be performed the next month is also discussed.

85/10/03 This document is a LMSC monthly progress report on the work done under the SS Trace Contaminant Control study for the month of September 1985. The focus of work during the period, & consequently the topic of the report, was: SS Contaminant Control Analysis Computer Program; Microbial Monitoring; and, updating the SS Trace Contaminant Load Model.

LMSC/F071313

This report describes the work performed during September 1985 on the prototype control moment gyro (CMG) effort and expected for the next month with indication of current problems and proposed corrective action. Work performed includes: preliminary design effort applied in preparation of Preliminary Design Review, including CMG hardware preliminary design and documentation of contract trade studies and resolution of open action items; engineering design, analysis, and drafting activity continued on the inner gimbal assembly. Forecasted work for October included: continue preliminary design and documentation activities; initiate the building and evaluation of local electronic circuits; initiate task to prepare preliminary reliability prediction for the Preliminary Design Review; and initiate preliminary design of CMG test station for the Review.

BENDIX8-36628 PR3

85/10/04 The purpose of this document is to provide a definition of the reqs for processing SS P/Ls thru KSC & VAFB for pre-launch & post-landing operations. This preliminary release is focused on the development of the facility reqs which result from customer ground processing facilities. The scope of this document is limited to the definition of processing flows & facility reqs. The reqs discussed herein are based on analysis of the current SS architecture, Mission Database, SATS, and the current operations philosophy. KSC p/l processing concepts, mission descriptions, time-phased mission sets, facilities reqs graphs, & test sets facilities reqs tables are also discussed or shown in this document.

R5.K.1

This document comprises the RUR-2 deliverable to GSFC; its content is based on EMS Theme output to be delivered. The document discusses the following general topics: 1) Configuration, the discussion of which is presented in 2 parts (1st-a "white paper" on the general options available for SP design & 2nd discusses the status of configuration convergence); 2) Policies & Strategies-Advanced Developments- this section addresses the analyses of AD Projects germane to WP-3 for IOC application & selection. A&R are discussed in terms of SLM, attached P/Ls, service, & SPs. Commonality and International Participation are also discussed.

GE/TRW RUR-2

This document comprises the RUR-2 deliverable to GSFC; its content is based on the EMS theme output to be delivered. The following topics are covered in this document and each consider the following: 1) STS Performance Capability & SSP Implications, the section which is to determine how the STS capabilities impact the design of the SPs & to determine mass limits & the viability of sys options; 2) Resource req, the section which examines the time phasing and analysis of resource req for SPs & the res req of power & P/L mass are presented for a generic polar SP & co-orbiting SPs; 3) Design-to-Cost, this theme presents the costs of the study options for the SLM Outfitting, SPs, Customer Servicing & Attached P/Ls & also provided are the Annual Operations Costs; 4) Customer Req, this section examines the req analysis for SP Customer Resources (life sciences, pointing, operations/servicing); 5) Safety, which discusses hazards & effects, selection of design config considering safety.

GE/TRW RUR-2

85/10/04 This document describes the WP-02 EMS Theme entitled "Develop Selection Criteria." This input finalizes the development of the selection criteria to be employed in ascertaining commonality candidates, pursuant to accomplishment of the commonality analysis study effort. The development of the selection criteria has resulted in the identification & establishment of the following related parameters which are expanded upon in this report: 1)study logic; 2)commonality categories/definitions; 3)classification & coding; 4)sys/subsys codes & descriptions; 5)characterization parameters; 6)operational suitability factors; 7)cost effectiveness considerations; and, 8)procurement factors.

SSS85-0100

This document describes the WP-02 EMS theme entitled "GSE Commonality Analysis." The overall objective of this trade study is to define the options for cost savings through identification & selection of commonalities across SSPES, as defined by NASA's RFP & other related documents. This study is to produce the identification of commonality candidates, their application across all segments of the SSP, & their impacts in terms of cost & technical risk. For the purpose of this report, GSE is defined as that equipment used to perform all service, checkout, & handling functions of SSP elements on the ground. ASE is that equipment carried on the P/L pallet to support P/L ops in space. OSE is equipment stored in the On-orbit SS to support maintenance, servicing, handling, & checkout ops in space.

SSS85-0099

This document details the study which was to consider the capability of the MTA to meet user req & the comparative development & operations costs to effect the required functions. All WP-3 elements are affected except the polar SPs which are designed to be man-tended only. The prime objective of the MTA is to defer the costs in deploying an initial SS which can evolve into a PMC while simultaneously assuring that the initial SS can accomplish useful work & not merely a habitat for the crew. Potential US & international missions for the first 5 years were identified, as were crew functions & schedules to support each mission. Resources required for IOC mission sets & configurations were estimated. Assessment was made of customer accommodations provided by MTA & PMC. The impacts of MTA on each end item is discussed for the following areas: attached P/Ls, SLM, & customer servicing.

GE/TRW RUP2-MTA

This document is a monthly progress report for September 1985 regarding the Station Maintainability Plan. The subject of discussion was the Maintainability Program Plan Outline. Also discussed was participation in a NASA-Martin Marietta Denver meeting to establish maintainability design goals in reply to an action item assigned by MSFC.

CO-3 004

This document is an appendix which contains preliminary descriptions of the configuration of the SLM DMS and the results of trade studies concerned with experiment accommodations & interface methodologies. The scope of the trade studies will be expanded in later reports to include autonomy, automation, test & verification, & growth areas, as well as to include h/w operating lifetime, maintenance approach, man-machine interface, p/l interfaces (life sciences & astrophysics), and servicing operations. The analyses & studies reported in this appendix focus on the following objectives: 1)to provide an information flow to NASA concerning the preliminary design for SLM/DMS in both the man-tended & manned configurations, and 2)to provide a vehicle for an iterative series of reports which will be refined & more fully documented in subsequent & other submissions.

RCA-ENS-R7.3.1

DATE	ABSTRACT	ID NO.
85/10/04	<p>This document is an overview of the SE&I study efforts of the WP-3. The following major topics are considered herein: STS Performance Capabilities and Space Station Program Implications; Resource Requirements; Customer Reqs; Safety; Architectural Concepts; ADP; A&R; Commonality; and, International Participation. Issues and results are included for the major topical categories. This document contains no formal, written text but utilizes lists, charts, and diagrams to relay information.</p>	RCA-EMS10
	<p>This document is to report the results of tasks which support the intent of the public law which mandated the use of A&R in the SSP. The following EMS milestones are to be addressed: Define A&R Candidates for IOC; Define Selection Criteria; Define A&R Technology Candidates for IOC; and, Define SCAR for growth A&R. Section 2 will present the status of the A&R candidate selection process. Section 3 presents the final list of A&R candidate selection criteria & a detailed treatment of the approach to A&R trade studies including an extensive discussion of cost models for new techs. Section 4 presents A&R technology candidates which were expanded to reflect the longer list of A&R candidates in section 2. Section 5 is concerned with the definition for growth A&R and presents the new techs required to support A&R growth.</p>	SSS85-0098
	<p>This document is volume 2 of a 3-volume set covering the EMS Data Package. This volume deals with Requirements. The following subthemes are examined in the document: Platform Sizing Analysis; Time Phase & Analyze Resource Req for SP; Life Sciences Req; SP Req Analysis; Pointing Req Analysis; Time Phase and Analyze Req for Customer Operations & Servicing; Customer Servicing Analysis Req Matrix; Dual Egress Req Impact Study; Module Isolation Req Impact Study; Emergency Definition & Containment Study; Attached P/Ls Safety Req; Critical Function, Caution, & Warning Analysis; and, Servicing Safety Requirements. Each of these subthemes supplies its own definition & states its purpose.</p>	RCA-EMS10
	<p>This document is volume 3 of a 3-volume set covering EMS Data Package of WP-3. This volume concerns itself with Configuration/Policy & Strategy. The following are subthemes under discussion in this document: SP Architecture Assessment; Analyze Advanced Development for IOC application & selection; Define A&R Candidates for IOC; Define Selection Criteria; Select A&R Candidates for IOC; Define Scar for Growth A&R; Methodology Definition; SS/SP Commonality Analysis; Module Outfitting/Systems Commonality Analysis; Develop Selection Criteria; Develop Functional Commonality Candidates; GSE Commonality Analysis; and, Define & Assess International Interfaces. Along with each subtheme, a definition and explanation of purpose is given.</p>	RCA-EMS10
	<p>This is a WP-02 DP 2.3A EMS theme document, the subject of which is Methodology Definition. The overall objective of the commonality analysis trade study is to define options for cost savings through identification & selection of commonalities across SSPEs as defined by NASA's RFP. The product of this study will be the identification of commonality candidates, their applications across all segments of SSP, and their impacts in terms of cost & technical risk. Applications were selected that satisfy cost constraints (e.g., improved logistics, improved cost & schedule, & reduced risks). This document finalizes the methodology to be employed in ascertaining commonality candidates & sets the logic flow pursuant to accomplishment of commonality study efforts.</p>	SSS85-0162
	<p>This is a WP-02, DP 2.3 EMS theme document, the subject of which is</p>	SSS85-0167

85/10/04 Advanced Development Activity for IOC Application and Selection. The technology assessments made consist of trend data analysis, preparation of logic diagrams, & identification of key issues for each discipline area. These assessments cover WP-02 projects in the NASA & RI AD plans. Three disciplinary areas are covered in this document: structures, GN&C, & EVA Systems. The structures analysis covers 5 technology items: Rotary Joint, A&R, Berthing System, LSS, & Flexible Tunnel Structure. The EVA Systems Analysis covers 4 technology items: EVA suit, EVA Support Systems, Personal Hygiene/Laundry, & EVA Life Support. The GN&C System Analysis covers three technology items: Advanced CMGs, Proximity Sensor, & Integrated Proximity Operations. Table 15 of this document gives a summary of issues identified for the technology items considered.

This is a WP-02, DP 2.3A EMS theme document, the subject of which is Safety. This document is composed of 3 sections. Section 1.0 is a schedule from a WP-02 perspective which lists the inputs which were to be forthcoming in this study; Section 2.0 provides the initial inputs. The topics covered in the document include: 1) Dual Egress Reqs/Impact; 2) Distributed ECLSS Study; 3) Module Isolation Reqs/Impact; 4) Emergency Definition & Containment; 5) Redundant Controls; 6) Rescue Reqs & Scheduling; 7) AP Safety Reqs; 8) Critical Function C&W; and, 9) Servicing Safety Reqs. Section 3.0 provides the assumed configurations at the end of each flight.

SSS85-0147

This WP-02, DP 2.3A document deals with the subject, "Micro-G Reqs." The study under consideration here is intended to provide the data required to assure fulfillment of the micro-gravity reqs. The data to be provided will address the following issues: definition of reqs, CA considerations, operational considerations including the definition of limitations compatible with reqs, definition of SS configuration constraints, & assessment of dynamic disturbances to achieve a cost effective dynamic attenuation approach. Section 2 presents a technical review of the adequacy of the existing micro-gravity reqs.

SSS85-0166

85/10/06 This document is the September 1985 progress report for the SS PLIMP/ Contamination study. The objective of this effort is to develop an improved set of plume/plume impingement codes which advanced the state of the art & improve the accuracy of calculated plume-induced design environments for the SS. During this period, the PLIMP code was executed on the VAX 11/780 for 2 simple cases of rectangular plates positioned in an RCS plume. Three plates were used in each case, with shading on two of the plates. Both cases were also executed using the original code on the Univac. Excellent numerical agreement was obtained b/w VAX and Univac versions of the code. Modifications which improve the capability & efficiency of the code were made. Future work and a financial report were given.

LMSC-F042648

85/10/07 This document is a data package containing information on the following WP-2 EMS Themes: Operations Requirements, Resource Requirements, Safety Themes, and Customer Accommodations.

WP2-EMS-DP-1-10/85

This document is a monthly progress report for June 1985 regarding Data Management Network Components. The following was accomplished during this reporting period: the design approach was solidified; the bill of materials was completed with nuts- and bolts-type items added. A list of materials received is also given. Problems and activities for the next month were also given.

CC8-36411 PR1

This document is Book II of the WP-2 SS Projects EMS Data Package. It contains data relating the following EMS themes: (C-5) Power Option; (S-1)

WP2-EMS-DP-2-10/85

DATE	ABSTRACT	ID NO.
85/10/07	<p>Advanced Development; (S-3) Logistics; (S-4) Commonality; (S-5) Maintainability; and, (S-6) Verification & Checkout. The discussion of the Power Option gives a risk assessment to the candidate power options due to DMV, DTV, & STS proximity ops. Analysis includes Docking & Berthing ops, the environment induced by Approach/Departure & Docking ops. The activity associated w/AD includes an analysis of Advanced Development for IOC application & selection. For logistics, the planning activity is to define WP-2 resupply/recycle reqs for IOC PMC, MTA, & growth. For commonality, the planning activity is defined as an analysis of system & subsys functions & equipment for commonality among SS modules, between the SS & SPs. For methodology, the activity is to describe for each subtask a general approach, specific methods & algorithms, & computer programs.</p> <p>This is a WP-02, DP 2.3A EMS theme document, the subject of which is Functional Commonality Candidates. The overall objective of the commonality analysis trade study is to define the options for cost savings through identification & selection of commonalities across SSPEs as defined by NASA. The product of this study will be the identification of commonality candidates, their applications across all segments of SSP, & their impacts in terms of cost & technical risk. Applications are pointed out which satisfy cost constraints (e.g., improved logistics, improved cost & schedule, & reduced risks). Tables B-22 in the document depict potential functional commonality candidates identified as a result of examination of related sys/subsys elements. Tables 23 & 24 indicate areas of potential commonality of other current programs with that of the SS. Table 25 identifies logistics spares candidates.</p>	SSS85-0148
	<p>This is a WP-02, DP 2.3A EMS theme document, the subject of which is Integration Assessment. This assessment is intended to ensure the compatibility of all systems w/in WP-02 and to ensure satisfactory I/Fs w/systems being designed & developed under other WPs. The WP-02 systems were monitored & reported for compatibility with the single keel "Power Tower" configuration.</p>	SSS85-0149
	<p>This is a WP-02, DP 2.3A EMS theme document, the subject of which is Module Pattern Analysis. The study is to investigate arrangements to the reference module pattern and determine the optimal pattern that satisfies the stated reqs with the least cost. The current results show that the optimal pattern that satisfies the stated reqs with least cost is the "Figure-8" module pattern with external nodes, airlocks, & tunnels. The study consisted of three separate evaluation phases: 1) a geometric evaluation that compared candidate patterns against each other; 2) evaluation of the leading pattern's orientation in relation to SS configuration options; & 3) an investigation of the implications of the candidate patterns on their internal architecture. Module pattern candidates were evaluated by these criteria: safety, risk, stability/control, user accommodation, maintainability, operation, performance, assemble, growth, A&R.</p>	SSS85-0151
85/10/08	<p>This document is a progress report for July 1985 for the SS Power Electronics Capacitor Development activity. Work on prelim designs for first phase studies of materials & processes was started. Work planned for the next reporting period was also discussed.</p> <p>This document is a progress report for September 1985 regarding Sperry's efforts in the Solar Alpha Joint Design. The work performed during the period: mechanical design of the Solar Alpha Joint completed & conceptual layout drawings finished; the radiator joint is in design layout; electronics design</p>	SECB-36437 PR1 SPERRY8-36415 FR3

85/10/08 concept based on a 120 VDC supply was completed.

This document is presentation material for a MMA review scheduled for 10/22/85 through 10/24/85 for MSFC. The topic for discussion at the meetings was the logistics simulation and data base development.

LOG-MMC-00008

This document is the August 1985 progress report for work done on the SS Power Electronics Capacitor Development activity. Work done during this month includes prelim designs & test plans for capacitors necessary to initiate work on first phase development program were ordered. Dielectric material required to assemble evaluation capacitors was ordered. Work for the next period was planned to include winding capacitor sections which were to be utilized for studies of materials & processing techniques.

SEC8-36437 PR2

This document is the September 1985 progress report for the SS Power Electronics Capacitor Development activity. The following were accomplished during this reporting period: 1)dielectric materials received; 2)prelim material characterization initiated to determine preferred conditions of capacitor section curing; 3)Sample Order Requests entered. Work planned for the future includes: winding of first capacitor sections, initiation of evaluations of winding parameters, & initiation of evaluations of capacitor section cure schedules.

SEC8-36437 PR3

This document is Volume I of a 2-volume set which contains data, decisions, and recommendations which reflect the WP-01 synthesized product. It is an analysis of the SS Common Module. Discussed is the CM launch & landing weight, CG constraints, payload bay structural loadings, positioning, design layout, weight lengths, & diameter data.

EL-13591

This document is Volume II of a 2-volume set which contains data, decisions, and recommendations which reflect the WP-01 synthesized product. This volume deals with the subsystem assessment of CM, MTL, LM, DMV/DTV accommodations, propulsion, and fluids. As part of the status of each WP-01 subsys concept, including parametric characteristics, input/output required, other operating & functional characteristics and an assessment of each subsys capability to meet overall program reqs.

EL-13591

This WP-02, DP 2.2 EMS theme document discusses Function Listing. This is an analysis done to develop function lists for each SS subsystem. These lists tentatively identify h/w items & interfaces w/other subsystems. These prelim results support the functional allocation process by contributing to allocation & interface recommendations. Also included are SS subsystem function trees.

SS885-0126

85/10/09 This report was submitted as a monthly report on the SS Structures Development activities. It will briefly detail the work performed during September 1985 & describe the work planned for October 1985. The cumulative costs to date, estimated cost to completion, and the estimated percentage of physical work completed are given. In some instances, the report amplifies or repeats some of the conclusions of the Quarterly Briefing presented at MSFC on Friday, 10/4/85. Three major efforts were concluded during Sept., one under each major task. In task 1, the Alternate Deployment Mechanism Trade Study was concluded with the recommendation that 2 deployment concepts be developed w/ 2 deployment concepts w/prelim designs for comparison with four jackscrew Ground Test Article Concept. In Task 2, a trade study was done to determine appropriate

RIC8-36421 MR4

DATE	ABSTRACT	ID NO.
85/10/09	material for the truss strut end fittings. Under Task 3, prelim trade study done recommending 2 promising concepts for prelim design studies.	
85/10/10	This document is a monthly progress for the Data Management Network Components activity for September 1985. In the document, materials received and physical inventory was taken to verify the accuracy of records.	CC8-36411 PR4
	This document is a progress report on the Atomic Oxygen Simulation System study over the period 9/11/85 through 10/10/85. Basic design activities on the AOSS continued and fine tuning on the atomic oxygen ion source design resulted in increased performance. Prelim AOSS design drawings were completed. Design of AOSS mass analyzer approached finalization w/fabrication/assembly of prototype device. Design analysis of AOSS exposure chamber was initiated. Funding constraints as well as meetings held during the period were also discussed. Problems and activities for the next period were also discussed.	MCR-85-646-4
	This is a WP-02, DP 2.3A EMS theme document, the subject of which is Airlock Location Analysis. The study under consideration in this document is designed to assess the possible configurations & locations of airlocks as incorporated into the overall SS config. In selecting the most appropriate ate config, several EVA internal lock configs were examined. The results of this study are to produce a single config that best meets the reqs of an EVA airlock for SS. Also established are the location of equipment airlock location & config. Relationship b/w EVA airlock & common module is discussed in terms of fabrication practice for weight, strength, cost, & commonality. Stowage & open space are considered.	SSS85-0152
	This is the second monthly progress report on NAS8-36603, STO. This study is to perform several tasks to define & plan a STO for operation on the SS. The tasks to be performed include: include identification of instruments that will comprise the STO that will fly on IOC SS; to perform analyses on config & conceptual design of SS; to develop a cost estimate & implementation plan for placing STO on SS.	TRWB-36603 MR2
85/10/11	This document presents a description of the constituents and the definition of the reference mission scenarios with the derived requirements for the Columbus program. These constituents are the Columbus element reference configurations, the operational in-orbit infrastructure, and the operational mission options. Mission scenarios have been defined for two types of missions: initial delivery missions and servicing missions. A set of requirements have been derived for each of the scenarios, preceded by general requirements, which are valid for all scenarios.	COL-RP-ER-0015
	This is a WP-02, DP 2.3A EMS theme document, the subject of which is Pointing Reqs Analysis. The scope of this study is to determine customer reqs for pointing accuracy, knowledge, attitude, & control. Also, the study is to design options to provide for P/L pointing. Pointing accuracy, pointing stability, & pointing knowledge as functions of mission accommodation are considered. Coarse Pointing System design concepts were analyzed & an exocentric gimbal system that minimizes microgravity disturbances. Key features of the CPS are listed.	SSS85-0153
	This status report for the period 31 August through 27 September 1985 describes the progress on the Propulsion Technology Program, NAS8-36418. The	85RC14541

85/10/11 objectives of this program are to provide a demonstration of hydrogen/oxygen propulsion technology readiness for IOC Station application, namely gaseous hydrogen/oxygen and warm hydrogen thruster concepts, and to establish a means to evolve from the IOC Propulsion System to that required to support advanced Space Station functions. Major accomplishments during this period are the publication of the Part I specification, the release of schematics and all major assembly drawings, and the completion of the Concept Selection effort in Task I. Overall progress is also described in the document.

This WP-02, DP 2.3A EMS theme document concerns itself with the subject of scar definition. This document describes the analysis of growth scarring which is to include the analyses of structures, systems, p/l provisions etc. required for mid-term growth will be assessed to determine if their incorporation at IOC is feasible and cost-effective. Preliminary scar definition is given in the absence of a detailed definition.

SSS85-0150

85/10/15 The purpose of this report is to document the detailed study plan for work underway at FACC entitled ARBC for an Evolving SS. This report begins with a description of the changes in the emphasis of the study that have resulted from discussions b/w MSFC & FACC personnel since the contract was awarded in May 1985. The second section describes the detailed study plan with updated milestones & task descriptions. The final section is a description of preliminary results of work conducted in the period from May through September 1985.

WDL-TR10569

This document is a progress report for September 1985 which discusses the Attitude Control System Test Bed Modification and Refurbishment. The report describes the work performed during the report period and forecasted for the next month. The topics discussed herein: modification and refurbishment of Skylab's control moment gyros (CMG) and CMG/Sensor System Refurbishment. Current problems and forecasted work are described.

BENDIXB-3640B PR4

This document is the September 1985 monthly progress report of activities related to the Long-Term Lubrication Analysis. The objectives of the program under discussion include the performance of complete tribology survey of every point of contact in the Station subject to relative motion regarding the materials, environment, and operation characteristics. The task activities during this reporting period included: completion of preliminary work breakdown structure of the Space Station; identification of the preliminary candidate moving mechanical assembly (MMA) set; identification of the contracts and NASA personnel associated with the MMA set; development of preliminary tribology survey form; review of computer options for data tape development / implementation; and continuing efforts on a literature review.

BCDB-36655 PR3

This document takes as its task to define the SSP & to give its reqs. Section 2 defines the overall SSP in terms of organizational & WBS & describes responsibilities of the major SSP participants. Section 3 defines the SS systems reqs to be used by all NASA & contractor organizations involved in design, development, production, test, & operation of SS systems; all SS systems are to conform to these reqs. Sect. 4 contains operations req for prelaunch/postlanding operations and apply to all SSP participants & customers; these reqs are Level B reqs. Section 5 defines the MRDB as the official repository for approved SS user reqs; new or updated mission req are to be entered in MRDB when received & approved. Section 6 establishes function & resource allocation req to increase efficiency of SS & utilization of its resources; allocations are made to flight

JSC-30000

DATE	ABSTRACT	ID NO.
85/10/15	<p>& ground elements & systems. Section 7 contains prelim definition & req of SSIS. Section 9 sets common h/w & s/w product assurance reqs re safety & reliability.</p> <p>This is the fifth monthly status report submitted in accordance with DR-14. The period of time covered by this report is 9/1/85 thru 9/30/85. This report provides a summary of MMA activities in support of MSFC SSP. The major effort during this reporting period was directed toward trades & analyses which support RUR-2. Major MSFC support activities were as follows: delivered RUR-2 Data Books, EMS Theme Data, & Executive Summaries on Schedule; recommendations were made & documentation provided to support NASA decisions; formed a working group to address IRR DRs content, format, delivery schedule. CM, LogM, MTL, P&VA, ADP, FO, logistics, TMIS, and productivity were also discussed.</p>	SSP-MMC-00006
85/10/16	<p>This document is a LMSC monthly progress report on the SS Thermal Storage/Refrigeration System Research & Development for Sept. 1985. The progress reported on involves the definition of reqs for both the thermal storage & refrigeration.</p> <p>This EMS document sets forth guidelines to analyze ADP for IOC Application and Selection. The purpose of this analysis is to determine their relevance to IOC needs. Data is reviewed to assure that the details of existing NASA ADP programs are available and used by the WP-3 designers in their trade studies & analysis. Findings are given not only for GSFC but also for 2 sets of contractors: RCA/LMSC/BASD and GE/TRW.</p>	LMSC-F042633
85/10/18	<p>The purpose of this EMS document is to show the range of the customer resource requirements for polar & co-orbiting SPs. This document contains summaries which show payload parameters ranges and present statistical summaries useful in analyses for Polar and Co-orbiting payloads.</p> <p>This document has as its theme STS Performance Capability & SSP Implications. A Sub-theme is Platform Sizing Analysis. The objectives of the study are to analyze platform sizing considerations in relation to STS capability and to define STS requirements in relation to platform support. Resource req, customer resource req for platforms, dual egress req, A&R Candidates for IOC, and a definition of Methodology are provided as well.</p> <p>This document is a progress report for the AC Power Processing Breadboard study for June 1985. The objective of this contract is to deliver to MSFC a 20 kHz, 5kW AC power processing breadboard. The components of the breadboard are listed. Progress was made during this period in the following ways: the review meeting which was held 6/22/85; the prelim system design, including the general config of inverters, transformers, & fault isolation switches was completed; 10% of the part which will be required to complete the breadboard were ordered. Problems, plans, and expenditures were also addressed.</p> <p>This document is a Reference Configuration Report and is limited in scope to the Columbus Initial Operating Capability, which contains the following elements: pressurized laboratory modules, man-tended free-flyers, free-flying platforms, and unmanned service vehicles. The report will consecutively describe the aforementioned elements and identify options, where appropriate. The descriptions of each element will follow the general outline of system architecture, interfaces, subsystems, budgets, and growth provisions.</p>	WP3-EMS-S1.3.2 WP3-EMS-R5.3.1 GSFC400.6#00104 6DB-36429 FR1
		COL-RP-ER-0014

DATE	ABSTRACT	ID NO.
85/10/18	<p>This document is actually a collection of different documents. See COL-ICD-ER-0001 and COL-RP-ER-15. Another of the "sub-documents" is COL-TN-ER-0017, Columbus Program Ground Processing. This document is a preliminary BL for ground processing. It relates the required ground processing activities to the defined reference mission scenarios of COL-TN-ER-0015 and describes the ground processing infrastructure and its special req to define consistent ground processing approach and derive ground processing sequences. Also included is COL-TN-ER-0020 which outlines the essentials of the Logistics BL concept. Logistics functions and the overall concept are outlined. COL-TN-ER-0027 provides a description of resupply categories, associated req, & a first assessment of volume & mass for upload & download configurations in respect to the reference missions. COL-TN-ER-0023 defines a prelim operational BL for initial assembly of Columbus elements. Also included is COL-TN-ER-0024.</p>	ESA-RUR2-DD-S04-5
	<p>This document is an EMS product document and its EMS item is "platform architecture assessment." The definition of the task to be performed is: to define platform architecture for polar & co-orbiting platforms and identify alternatives & architecture drivers. Configurations are considered: integrated, modular, power generation options, and thermal control options. Major drivers are considered: field of view req, weight, adaptability, STS launch limitations, ease of servicing, and growth capability. Configuration drawings are given for the following: AXAF C-orbit; modular core; integrated core; dual solar array trapezoidal structure; and, single solar array trapezoidal structure.</p>	WP3-EMS-C1.3.4
	<p>This document is an interface control document which defines the design of the interfaces between the US Space Station and Columbus. The interfaces defined by this document establish an operational Space Station configuration unique to the US Space Station and Columbus elements for configurations as defined in Sections 2 through 8 of this document. The specific interface areas controlled by this document are the physical, functional, environmental, and operational interfaces which are included in the main chapters for each of the configurations: 1) pressurized Lab Module integrated to the US Station; 2) pressurized Lab Module attached to the US Station; 3) free-flying platform, polar to the US Station; 4) free-flying platform, coorbiting to the US Station; 5) unmanned service vehicle to the US Station; 6) resource module to the US Station; and 7) man-tended free-flyer to the US Station.</p>	COL-ICD-ER-0001
	<p>This document is prepared for the purpose of both NASDA/NASA technical coordination, & Japanese RUR-2 DP based on EMS. The first issue of the document was prepared for the technical coordination meeting which was held on June 13-14, 1985 at JSC. The document contains the Japanese study results thereafter. Also shown will be the correlation b/w EMS activity & the code number. Also contained herein: JEM Module Outfitting Study -internal arrangement; Preliminary Reboost Analyses; Preliminary Operating Altitude Study; Assembly Sequence Study; Customer Resource Req; Assessment of Module Internal Operating Pressure; Micro-6 Req; Japanese Servicing Req to SS; Customer Accommodation Assessment; Japanese Mission Accommodation; Maintainability Approach; GaAs Solar Cell Study; Prelim Study on Functional Allocation; Logistics Allocation; Degree of ECLSS Closure for JEM; Safe Haven; Current Concept of Berthing Mechanism; Safety; Power Distribution.</p>	SU-285010B
	<p>This document takes a Platform Sizing Analysis as its EMS item. The purpose of the task is to determine how STS capabilities impact the design of</p>	WP3-EMS-R1.3.3

DATE	ABSTRACT	ID NO.
85/10/18	<p>the SPs and to determine mass limits and the viability of system options. The document provides an overview of platform design reqs, genesis of generic P/L envelope, an overview of decision criteria, study methodology, study parameter alternates, platform sizing considerations, STS lift req considerations, and STS IVA/EVA Support activity. Conclusions & recommendations are also given.</p>	
	<p>This document takes for its EMS item the following: Station/Platform Commonality Analysis. The goal of this task is to analyze data received from WP-1, WP-2, & WP-4 to refine the commonality candidate list. The document provides a list of active commonality candidates.</p>	WP3-EMS-S4.3.2
	<p>This document takes Servicing Safety Requirements as its EMS item. The purpose of the task at hand is to identify threats to the crew, SS or p/l's associated with servicing of SPs, free flyers, OMV, or p/l's. It also is to define requirements that eliminate or control these threats and to assess & evaluate design & cost impacts of servicing safety. Included in the document are a Hazard Chart and a Threats List as provided by contractors.</p>	WP3-EMS-R6.3.9
	<p>This document takes the Definition of A&R Candidates for IOC as its EMS item. The objective in this task is to define SS functions to be considered candidates for automation or performance by telerobotics at IOC and to characterize each candidate according to specific attributes that will be established jointly by Levels B & C. Examples of such attributes are cost, productivity, and safety. It also is to assess the impact at the subsystem of automating each of the recommended candidate functions. A&R Candidates for IOC are presented for the following: SLM, SPs, Servicing, & attached P/Ls.</p>	WP3-EMS-S2.3.1
	<p>This document takes the following as its EMS item: Module Outfitting/ System Commonality Analysis. The purpose of this task is to identify SLM equipment candidates for use in other SSPEs (subsystems, components, etc.). Also it is to review equipment candidates identified by other WPs for use in the SLM. The document provides a summary listing commonality candidates and requirements.</p>	WP3-EMS-S4.3.3
	<p>This document takes the following as its EMS item: to Define Functional Commonality Candidates. This document contains functionality definitions and findings for each of the WP-3 projects.</p>	WP3-EMS-S4.3.5
	<p>This document takes the following for its EMS item: Develop Selection Criteria for Commonality. The objective of this task is to develop the criteria that will be used to make the final selection of the hardware and software for common use in the SSP. The candidates for common use are discussed and selected in other subthemes.</p>	WP3-EMS-S4.3.4
	<p>This document takes the following for its EMS item: GSE Commonality Analysis. The purpose of this task is to conduct a commonality analysis in order to identify opportunities for common usage GSE. All elements of GSE are treated together because at this point the identification of GSE can only be by generic item only. Discussed also are: Electrical GSE & Telemetry, Tracking and Command Subsystem.</p>	WP3-EMS-S4.3.7
	<p>This document takes the following for its EMS item: Methodology definition. The purpose of this task is to define the approach which is to be implemented in determining the practicality of commonality for a given piece of hardware or software in the element.</p>	WP3-EMS-S4.3.0

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85/10/18	<p>This EMS document defines non-resource customer requirements on SPs. The 6 major non-resource categories identified are: field-of-view; pointing, stability, & attitude determination; time data; ephemeris data; contamination; and, structural/dynamics considerations. Non-resource req identified include radiation, safety, storage, optical windows & airlocks, and tether use. A summary of the findings is given. SP GN&C pointing performance definitions are given.</p> <p>This EMS document takes as its purpose to describe a task which is to define the time-phased set of capabilities required for customer servicing; these capabilities include support of polar & co-orbiting SPs, free flyers, attached P/Ls, SLM P/Ls, and support system capabilities (IVA/EVA, MRMS, Pressurized Work Area, etc.). Customer servicing & operations are discussed, as is the Dual Egress Requirement/Impact Study.</p> <p>This EMS document takes Module Isolation Requirement Impact Study as its item of discussion. The purpose of the task is to summarize features of SLM as they relate to module isolation and assess the impacts of module design. Findings were made regarding the following: module partitions, primary means of isolation, specimen & cage manipulation, Pathogen free animals, isolation breakdown, and animal escape. Descriptions are also given of the following: Emergency Definition and Containment Study, safety isolation requirements, containment scenarios, safe haven, & SP candidate threats.</p> <p>This report discusses the progress & monthly status of the "Advanced Planar Array Development" for SSP for the period 1 August 1985 through 30 September 1985. The following were accomplishments in the period reported upon: design drawings for the Task 2.0 h/w were generated under Task 1.0; thermal & stress analysis were initiated; 2 bonding tools were in process of being fabricated in support of the superstrate modules; quantities of mechanical solar cell simulators were estimated.</p>	<p>WP3-EMS-R5.3.3</p> <p>WP3-EMS-R5.3.8</p> <p>WP3-EMS-R6.3.2</p> <p>LMSC-D973462</p>
85/10/21	<p>This document is a progress report for Sept. 1985 of work done on NAS8-36629 Orbital Equipment Transfer Techniques. During Sept. the final drafts of Task 1 outputs were completed. The collection of equipment transfer h/w & techniques & the development of functional reqs for equipment transfer were compiled thru literature reviews, SS reqs reviews, & a review of existing technologies for workstations. Progress planner for Oct. includes anticipation of FY86 funding levels for Orbital Equipment Transfer techniques.</p> <p>This report summarizes the progress made on the Intelligent Robotic Systems Study program during the period from 9/1/85 through 10/4/85. The work performed during the report period and the activities planned during the next period are discussed. Technical and programmatic issues which were encountered are outlined, along with the approach planned for resolution. Work accomplished included: efforts at using DMV servicing for derivation of sys reqs; work proceeded on the definition of the control sys, reqs, & h/w selection; the general concept for overall sys, from a control sys point of view was prepared to define the information flow b/w the AI, video, & control systems; selection process was outlined for a vision sys (cameras & computers) which will provide an upgrade to the Robotic Locating Sys h/w & s/w environment; work on AI planner; and, work on architecture.</p>	<p>ESSEX8-36629 P33</p> <p>MCR-85-654-2</p>
85/10/23	This document chronicles Canadian efforts during SS Phase B studies of	1STF-CRC-10/85

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85/10/23	the analysis, definition, design & integration of the SS ISTF with its associated subsystems. This includes network distribution systems, primary & secondary structure, data management, electrical power distribution, thermal management, crew interface & control functions. In addition, the studies include the definition, design, & integration of those elements capable of supporting the berthing, maintenance, resupply, assembly, checkout, repair, update, & instrument exchange on free-flyers, platforms, and payloads. This document contains no formal text but utilizes charts, diagrams, and lists.	
85/10/24	This document is the progress report for September 1985 on the MADDS Lab Demonstration. The following work was performed during this month: the distribution media & topology studies were completed; revisions to the SOW were completed & were submitted. Current problems, work to be performed during the next reporting period, and cost information were also included.	HADB-36430 PR4
85/10/25	This document was submitted to N.B. Hutchinson of JSC from K. Doetsch of NRC as data to be used in NASA deliberations concerning the SS. This document contains data concerning the following: STS performance & SSP implications; SS operations req; resource req; design to cost; customer req; safety; architectural concepts; growth; module pattern & size; customer accommodations; power option; function allocation; logistics; commonality; maintainability; verification & checkout; and, reference configuration.	NRC-SS002
85/10/28	The purpose of this document is to provide a definition of the reqs for processing SS P/Ls through KSC & VAFB for pre-launch & post-landing ops. These reqs will be based on analysis of the current SS Architecture, the Mission Database, the SATS, and the current ops philosophy. The preliminary release is focused on the development of the facility reqs which result from customer ground processing activities. The next version of the document will address the customer processing flows in more detail in terms of integration & verification activities. The scope of this document, in the initial release, is limited to the definition of processing flows & facility reqs.	EMS-FRR/SAT RS.V.1
	This document contains an EMS Product under WP-2. The EMS Theme is C6- Functional Allocation. The planning activity is to establish lists of SS functions, develop functional allocation criteria, allocate functions to WP elements, & recommend interfaces (w/rationale) based on resultant functional allocations. Data are included in the document which represent interim data that will be finalized in the last C6 data submittal in 12/85. The data also identify issues associated with hardware responsibilities & interfaces.	WP2-EMS-DF-10/85
	This document is a monthly progress report of the ARBC study for September 1985. September 1985 was mainly occupied with the preparation of study plan & prelim analysis report. This report includes the following deliverable items required at the end of FY85: a) a complete study plan for the 3-year effort with summaries of major objectives & milestones; b) definition of all time varying characteristics pertinent to the attitude control problem- identification of candidate solutions for each time varying characteristic; c) an outline of the approach & technique for each major objective; d) submission of prelim block diagrams, equations, & computer listing; e) description of prelim results.	FACC8-36420 PR7
	This document is an ESA RUR-2 Data Package and contains material related to the pressurized module & service module which is used in a	ESA-RUR2-DATA-10/85

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85/10/28	<p>free-flying configuration. 19 Major Program Themes are listed: 1)STS performance capabilities & SSP implications; 2)SS operations req; 3)resource req; 4)design to cost; 5)customer req; 6)safety; 7)standards; 8)architectural concepts; 9) growth; 10)module pattern/size; 11)customer accommodations; 12)power option; 13) function allocation; 14)advanced development program; 15)automation & robotics; 16)logistics; 17)commonality; 18)maintainability; 19)verification; and, 20) international participation.</p> <p>This document which is an update to the 7/26/85 document of the same title has 2 objectives: develop the definition of KSC processing for SS p/l's and to use this p/l processing definition for assessing the Customer Ground Processing Reqs. In order to do this, the document discusses and combines current & past experience from all areas: KSC P/l processing experience, KSC facility constraints, Orbiter processing constraints, SS architecture, SS Mission Database, SATS, and Customer Policy.</p>	EMS-CBPA-85,K.1
85/10/29	<p>This document contains chronologically-charted information concerning work within the SS EMS. It is arranged according to the 20 EMS themes: 1) STS Performance Capabilities & SSP Implications; 2)SS Ops Req; 3)Resource Req; 4) DTC; 5)Customer Req; 6)Safety; 7)Standards; 8)Architectural Concepts; 9)Growth; 10)Module Pattern/Size; 11)CA; 12)Power Option; 13)Functional Allocation; 14) ADP; 15)A&R; 16)Logistics; 17)Commonality; 18)Maintainability; 19)Verification; and, 20)International Participation. Listed in charts form are the theme activities with its subdivisions and a timeline on which milestones are projected.</p>	JSC-30208
85/10/30	<p>The purpose of this document is to provide a detailed set of system level design requirements. During Phase B1, it represents the focal tool for requirements documentation and for critical review by all parties involved. At the present state of revision in some areas, the report lists detailed requirements established as a result of evolution from a general concept to a defined system. In other areas, the report quotes the conceptual requirements which have been imposed. The scope of the requirements contained in this report is limited to the Columbus Initial Operating Capability segment. The elements covered are: pressurized lab module; free-flying platforms; unmanned service vehicle; resource module; and man-tended free-flying pressurized module.</p>	COL-RF-ER-000A
85/10/31	<p>This document is a monthly progress report from USRA involving the SS Natural Environment Design Criteria Studies. October 1985 was the period reported. The topics for discussion were: a meeting set for November at which middle & upper atmosphere models & user needs were discussed (meeting was held at the Carriage Inn in Huntsville); relevant phases of middle & upper atmosphere physics & modeling, and users from NASA, the Navy, NORAD, & several contractors.</p> <p>This document is a progress report for October 1985 of the Space Station Common Module Power System Network Topology and Hardware Development Program. The following topics received attention in the report: requirements definition; the loads data base; conceptual network layout and concepts selection; and network evaluation and hardware definition. Objectives for November 1985 are listed, as are the major concerns of the study.</p> <p>This document is a progress report for the period of October 1985. The report covers the progress on the Three Axis Simulator Control System as a replacement to the existing Fecker Systems' encoding & control equipment with</p>	<p>USRA8-36400 PR1</p> <p>MCR-85-619-5</p> <p>SCB-36409 PR3</p>

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85/10/31	associated cabling using NASA's Simulated SP. Sys integration, sys acceptance testing, technical data, & documentation will also be in support of refurbishment. The current progress, as well as past progress, is chronicled in this document. Current progress regards: h/w modifications; sys integration; sys test procedures development; technical support functions; and, technical data & documentation.	
85/11/01	The purpose of this document is to establish uniform configuration management procedures for the control of all JSC SS Projects & to implement the req contained in the SS Level B Configuration Requirements Document. Described herein are the procedures to be used in identifying & establishing BLs. These configuration control procedures will be used to baseline reqs, process changes to those reqs, & to establish the program configuration BL. These procedures will be used to manage the Configuration Control Board & any other boards. This document was intended for use by JSC & contractor organizations supporting SSPD. The objective is to provide a practical method for the identification, control, & documentation of reqs & configuration BLs, the control of changes to BLs, & assurance that the as-built configuration agrees with the approved configuration BL.	JSC-31010
	This document contains a description & user's manual for the SS Detailed Cluster Loop Water Recovery Model prepared in accordance with ECLS Integration Analysis Contract. The Detailed Water Recovery Program provides transient tracking of water & contaminants w/in SS clusters. This model follows these constituents thru all active components while maintaining a mass balance on the overall sys. Sources of water which can be modeled include: A)urine & urine flush water; B)shower, hand, dish, & clothes wash water; C)condensate from humidity control systems; D)carbon dioxide reduction water; E)EVA waste water; F)food & experiment preparation water; and, G)latent water (condensate from washing process, electrolysis). For each of these sources, the program tracks chemical composition, quantity, component pressure, & temperature.	MDC W5060-1
	This document contains a description and users' manual for the SS Coolant Loop model prepared in accordance with the ECLS Integration Analysis Contract SOW. The SS Coolant Loop program is a computer-aided engineering tool intended to provide a method for evaluating the design configs of a TCS. The following sections provide descriptions of the program structure & solution techniques & provide a sample execution of the model for reference ECLSS coolant loop: program operational overview; solution overview (solution routine, user ops routines, two-phase considerations); sample program; references; source code listing; sample problem results.	MDC W5059-1
	This document contains a description of the MSFC/J70 Orbital Atmospheric Density Model, a modified version of the Smithsonian Astrophysical Observatory Jacchia 1970 model. The algorithms describing the MSFC/J70 model are included as well as a listing of the computer program. The 13-month smoothed values of solar flux & geomagnetic index, which are required as inputs for the MSFC/J70 model, are also included & discussed.	NASA TM-B6522
	This document contains the detailed development and users' guide for the Detailed Oxygen Recovery Model which were prepared in accordance with the ECLS Integration Analysis Contract. The document is divided into 3 major sections: 1)process definition of solid polymer electrolysis and static feedwater electrolysis; process modeling of solid polymer and static feedwater;	MDC W5061-1

85/11/01 and, sample results, which are also given for solid polymer & static feedwater.

This document discusses the Task 2 Clothes Washer/Dryer concepts & study. The objective of Task 2 was to select a preferred clothes washer/dryer sys config. In order to meet this objective, a basic method for washing & drying clothing was selected prior to developing & evaluating concepts. Candidate washing methods included dry cleaning, ultrasonics, total immersion techniques & spray techniques, each with water as its solvent. The advantages/disadvantages of each of these are provided. Dry cleaning is also considered. Under Task 2, 10 clothes washer/dryer concepts were developed, from which a preferred config was selected.

MDC-02-300-20-09

This document is a monthly report for September 1985 of Ball's work on the Electro-Optical Sensor Assembly study. The following were some of the efforts accomplished during this reporting period: mechanical detail drawings were reviewed by production planner for producibility and to prepare production orders and raw materials; and certification logs were written for the sensor electronic assemblies and sent to stores for kitting. Included in the report is the cost information required for progress payments, the Thermal Distortion Analysis, and the Detector Chip Thermal Analysis.

BASDB-36627 PRA

This document is a report constituting the final report on the design & development phase of the Video Bandwidth Compression advanced development project. Image data compression is a process to reduce the number of bits used to represent a digitized image, while preserving image quality. In digital image processing, each image sample is quantized to a fixed number of bits. The utility of data compression arises in conjunction with the storage or transmission of images, when the goal is to minimize the memory needed for storage or the bandwidth needed for transmission. Typically, a compressed image, when decoded to reconstruct its original form, will be accompanied by some distortion. The worth of a compression technique is evaluated by assessing its data compressing ability,

MDC-02-300-20-15

This document is Book 1 of a 2-book set dealing w/DP 2.4A. Book 1 deals w/resource reqs; standard development; CA (servicing, AP accommodation, special accommodation); power option (proxops, drag, controllability/pointing, growth path, assembly); function allocation (function listing, allocation criteria/recommendation, I/F recommendation).

MDC-H2025

This document is Book 2 of a 2-book set dealing w/DP 2.4A. Book 2 covers the following areas: logistics (logistics items, sparring approach, ground accommodation/storage); commonality (module, SS-SP, module outfitting, GSE); maintainability (ORUs, accessibility, special tools, maintenance, fault tolerance, on-orbit vs. ground repair); verification & checkout (ground verification flows/tests, ground vs. on-orbit trade, test vs. analysis trades, protoflight vs prototype option, growth verification application option, primary envelope, scope data/bite reqs, ground C/D reqs, ground vs on-orbit checkout testing).

MDC-H2025

This document is divided into 2 sections: personnel transportation and SS/SP commonality analysis. The objectives of the first section is to provide SS crew accommodations, ops, EVA, and safety reqs as related to STS transportation of SS crewmembers for normal crew rotation & emergency rescue. Section 2 takes as its objectives to implement the commonality analysis methodology b/w WP-02 &

MDC-H2021

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85/11/01	the SPs and to conduct commonality analysis & trade studies for the items identified as potentially having some degree of commonality.	
	This document is the October 1985 monthly progress report on the ECLSS Integration Analysis. The document contains the following: a) quantitative description of work performed during the work period; b) summary of work planned for next reporting period; c) summary of problems/concerns; d) summary of manpower expended in current month, cumulative manpower expenditures to date, estimate of physical completion of contract, and explanation of significant variances. The following items were accomplished during the period: detailed consumables model; oxygen recovery program; water recovery program; coolant loop program; BMR; H/W procurement; cluster equipment cooling; air temperature control & flow distribution.	MDC W5039-6
	This document presents the theoretical development & use of the detailed carbon dioxide reduction models which were prepared in accordance with the ECLS Integration Analysis Contract. Two processes of carbon dioxide reduction are discussed herein: 1) Sabatier Process and 2) Bosch Process. Sinda Source listings are given for each of the processes, and plot package interface is discussed.	MDC W5062-1
	This document serves to identify SS external contamination types & their effects on the EMU. Also discussed is the development of detection & measurement hardware for the determination of the safety level of the environment. Discussed is the development of decontamination techniques & H/W for decontamination of the EMU to a safe level.	MDC-ADP05-01
	This is a WP-02, DP 2.3B document, the subject of which is SS & SP commonality analysis. The overall objective of the SS-to-SP commonality analysis is to define the options for cost savings thru identification of h/w & s/w common usage items, with the scope of the effort encompassing both co-orbiting & polar orbiting SPs. The identification of commonality candidate will include related systems & subsystems to the ORU level, support equipment, procedures, & applicable training reqs. Applications across all segments of the SSP (including SS-to-SP) & their impacts in terms of cost & technical risk comprise another product of this study.	SSS85-0177
	This document is a WP-02 report which recommends a language for AI applications for SSP from among several candidate languages. Section 2 defines AI & its subfields. Section 3 identifies AI programming environments & language reqs. Section 4 compares the candidate AI languages using the reqs of Section 3. Section 5 contains a summary & conclusions. Section 6 lists references. The objective of this study is to provide an analysis on the selection of a standard HOL for SS AI software. It identifies the major application areas for AI & typical HOL reqs needed to support those applications. Several candidate languages are identified & measured against those reqs. The intended scope of this study includes the AI s/w applications which are to be developed for use in both the space-borne & ground-based s/w for SSP.	SSS85-0161
	This report documents the completion of the docking & berthing sensor interface definition phase of the development project which evaluated D&B for simplifying h/w complexity & processing while reducing costs. This report describes both the electrical & mechanical interfaces as well as the integration effort being performed to insure a compatible D&B sensor capability.	MDC-02-300-20-19

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85/11/01	<p>This report summarizes the work accomplished under the Integrated Wall Design and Penetration Damage Control study during October 1985. The objectives of this contract are 1) to develop an integrated module wall design for the Common Module that will meet requirements for internal pressure, launch and berthing loads, meteoroid and space debris environment and thermal radiators and 2) to develop a penetration control plan to assess the effects of primary wall penetration and for module repair/replacement following impact. During this period, progress was made in the following areas: velocity distribution and density comparison; penetration resistance capabilities of test configurations; the computer program BUMPER 2.1. Future plans are also discussed in the document.</p> <p>This WP-04 EMS document discusses Strategy 2 A&R. Strategy 2 defines & categorizes the use of A&R for each subsys of the SS & SP power systems. The application candidates task (S2.4.1) is a definition of the functions to be automated or performed by robotics. The selection criteria task (S2.4.2) is to develop a set of criteria to be used to decide whether a function should be automated or performed using robotics. The candidate recommendations task (S2.4.3) is a list of A&R technologies to be incorporated into the SS power sys design. The scar for growth task (S2.4.4) is an identification of A&R functions for SS growth & definition of SS scar to accommodate the growth technology.</p>	<p>BAC8-36426 PR5</p> <p>RUR2-EMS-WP4</p>
85/11/05	<p>This document is a report describing the work during October 1985 on the prototype control moment gyros (CMG) effort and that expected for the next month with indication of current problems and proposed corrective action. Work performed during the period includes: preliminary design effort continued in preparation for the Preliminary Design Review (PDR) at Bendix; rescheduled PDR for 9 and 10 December; preparation reliability prediction was started; preliminary design of the CMG test station was started; engineering detail design, analysis, and drafting activity continued on inner gimbal assembly; the build of need local circuit breadboards was started; effort to estimate the size and quantity of circuit cards needed in each electronics box was continued. Forecasted work consisted of continuing necessary preliminary design, circuit breadboard, and documentation activities in preparation for PDR.</p> <p>This document is the October 1985 LMSC monthly progress report which reports on SS Trace Contaminant Control. The work reported on herein includes efforts on the SS Contaminant Control Analysis Computer Program, on Microbial Monitoring, & on RLSE contaminant control sys test recommendations.</p> <p>This is a monthly progress report of work on NAS8-36585, Rotary Joint Mechanism Test Bed, for November 1985. Work carried on during this period included: mechanical design activities continued; fabrication drawings of Rotary Test Actuator completed; load torque motor detailed drawings were prepared. Work to be performed during the next reporting period was also discussed.</p>	<p>BENDIX8-36628 PR4</p> <p>LMSC/F071321</p> <p>CE8-36585 PR5</p>
85/11/06	<p>This document is a progress report for October 1985 for the SS Power Electronics Capacitor Development activity. The following was accomplished during this period: 1) approximately 300 capacitor sections wound for initial evaluations of winding parameters; 2) initial evaluations of dielectric shrinkage behavior indicated that increasing the electrode metallization thickness also increases. Work for the next reporting period was also listed.</p> <p>This document is a progress report for October 1985 of work done on</p>	<p>SEC8-36437 PR4</p> <p>BASDE-36627 PR5</p>

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85/11/06	the Electro-Optical Sensor Assembly study. The following activities were discussed during this period: production activities relative to fabrication of the sensor mechanical details and the electronics assemblies were initiated; drawings for the mechanical details currently being fabricated were sent to MSFC. Enclosed in this report is a drawing breakdown of the MSFC sensor which identifies the details and assemblies required to fabricate the sensor and lists drawings previously sent. Cost information for progress payments are also the included in this document.	
	This document is the LMSC monthly progress report for the SS PLIMP/ Contamination study for October 1985. The objective of this effort is to develop an improved set of plume/plume impingement codes which will advance the state of the art & improve the accuracy of calculated plume-induced design environments for the SS. The PLIMP code, which was previously converted to VAX 11 FORTRAN & executed on the VAX 11/780 for 2 simple cases of rectangular plates, was executed using the more complex geometry from the Interim Input Guide sample problem. The same RCS flow field was used for all 3 of these sample problems. In all 3 problems the PLIMP code executed properly. Additionally, the numerical results of all 3 problems compared favorably w/ Univac analyses using the original PLIMP code except for the flowfield pressures in the third problem. The contour plot code was made ready for installation on the MSFC VAX System. Future work and a financial report are also given.	LMSC-F042680
	This document is the sixth monthly progress report for the Non-Contacting Slip Ring Program. During the month of October, the contractor submitted a plan for completion of Phase I as requested by MSFC. Also, Schwartz built & tested one digital encoder, and the second digital encoder is about 80% complete. Plans for the next reporting period and total expenditures & obligations are shown in the document.	SEDI8-36416 PR6
85/11/07	This document is a monthly progress report for October 1985 concerning the Orbital Equipment Transfer Techniques efforts. During this month, a progress review meeting was held with MSFC, Essex, & Rockwell technical staffs to review the technical outputs of Task 1. Plans for the next phase of the contract were also discussed. During November the following are planned: a formal presentation of technical progress to date was to be made to interested parties.	ESSEX8-36629 PR3
85/11/08	The details in this report reflect an emphasis on how business is conducted rather than how to achieve and assure quality compliance. Cost savings recommendations are discussed in the document. The following are some of the recommendations: Failure Mode and Effects Analysis needs consideration; consolidate reliability and quality software requirements under quality assurance requirements; allow analysis to justify non-standard parts in specific cases; tailor data requirements descriptions to the individual contract; involve Quality Assurance in the product and process development to assure early quality participation in formulating design requirements; and enhancement of the software configuration and verification functions.	2-B180-JCT-052
	This monthly progress report has been prepared for the Advanced Orbital Servicing Technology study for 9/30/85 through 10/31/85. A summary of technical progress during this period includes: ECLSS- changeout of BMR; Propulsion sys- RCS thruster module changeout, RCS assembly changeout, RCS refueling; DMV- propellant resupply, ORU replacement, payloads & front end kits changeout. Servicing options were defined for the following tasks: MRMS, TR,	SA-ADST-RP-05

85/11/08 MFR, IVA, EVA, MMU, MMM, & PFR.

This report discusses the progress & monthly status of the Advanced Planar Array Development for SSP for the period 1 October 1985 through 31 October 31 1985. The following work was accomplished during this period: the blanket design & analysis were curtailed until FY 87 funder were available; superstrate bonding & fabrication tools were continued; panel fabrication & testing activities were also postponed due to funding constraints. Current problems regarding manpower, material, & management were discussed, as was future work.

LMSC-D973466

This report is a monthly report for the SS Structures Development for October 1985. It details the work performed during October 1985 and describes the work planned for November. Cumulative cost to date, estimated cost to completion, & the estimated percentage of physical work completed are also given. During October, work proceeded on Task 1, Development of Alternate Deployment System, and Task 3, Assembly of Structures in Space/Erectable Structures. Efforts on Task 2 were limited. In Task 1, work commenced on preliminary designs for Linear Motor & the Semi-Manual Tool Deployers. In Task 3, work was begun to assess the impact on the assembly ops & design reqs of the selected dual keel reference config.

RICB-36421 MR5

85/11/10 This document is a progress report for the period 10/11/85 through 11/10/85 for the AOSS study effort. During this period, the AOSS mass analyzer design was finalized & fabrication/assembly of the prototype device was initiated. Design analysis of optional AOSS exposure chambers addressed 2 primary configs. Preparations continued for the AOSS Design Review at MSFC in January 1986. The AOSS Quality Plan was completed during this activity period. Problems, future activities, and expenditures to date were also discussed.

MCR-85-646-5

This document is the 3rd monthly progress report on NAS8-36603 STO study. This study is to perform several tasks to define & plan a STO for operation on SS. Three basic tasks are to be performed in this study: to identify a set of instruments that will comprise the STO that will fly on the IOC SS; to perform analyses on config & conceptual design of the STO; to develop cost estimate & implementation plan for placing STO on SS.

TRW8-36603 MR3

This WP-02 document is a report which presents the results of analyses which address the selection of a principal programming language for the SSSC s/w. Section 1 contains an overview, scope, & executive summary. Section 2 contains a summary of recommendations & conclusions about the Ada programming language. Section 3 describes the functions of the SSSC & the existing NSTS MCC s/w. Section 4 identifies s/w needs of the SSSC & explains how Ada can support these needs. Section 5 contains summary & conclusions. The objective of this study is to provide a technical report about the suitability of Ada for selection as the principal HLL for SSSC. It identifies the s/w reqs of SSSC & the HLL features needed to support the development of those s/w areas. Ada language characteristics are described in terms of quality & reliability. The scope of this study includes the s/w for mission control, administration, management, communications, & scheduling functions performed by SSSC.

SSS85-0161

85/11/11 This document is a monthly progress report for the Data Management Network Component Activities for the October 1985. The material status is depicted in a chart in the document. Assembly of the first Motorola System was

CCB-36411 PR5

DATE	ABSTRACT	ID NO.
85/11/11	booted up and tested during this period. Problems, future plans, and a financial statement are also included.	
85/11/12	This document is a monthly progress report for October 1985 involving the Space Station Maintainability Plan. The topics of discussion during this period include: Maintainability Design Requirements; Maintainability Design Requirements; and Maintainability Program Plan Outline.	CO-3 005
	This document is a progress report concerning study activities on the Space Station Body Mounted Radiator (BMR) Systems Program for the period from 3 September 1985 through 3 October 1985. The purpose of this effort includes the evaluation of the effectiveness of BMRs on the various modules for the proposed Space Station configurations. Structural integration techniques for these systems with respect to the spacecraft's skin are examined. Fluid and thermal interface issues are addressed with regard to the internal fluid system. The analysis review was completed on 4 November 1985 with a presentation having been made to MSFC. Much of the analytical effort was conducted based on the Power Tower configuration, but conclusions were reviewed to evaluate the impact of the change to Dual Keel. A summary of the analysis review presentation is given. Problem areas, schedules, costs, and work planned for the next reporting period are discussed.	3-14000/SR-25
	This document is a progress report which discusses work done under the Space Station Body Mounted Radiator (BMR) Systems Program for the period from 3 September 1985 through 3 October 1985. The topics for the study during this period include: definition of new heat rejection loads for the BMR, including updated power requirements and safe haven loads; and evaluation of transient performance of the BMRs with new loads. Current heat rejection requirements, latest heat rejection requirements, and safe haven loads are treated as well. Graphs and charts are presented which deal with heat dissipation. Problem areas, schedules, costs, and work planned for the next period were also discussed.	3-14000/SR-25
	This document is the progress report for the month of October 1985 for the AC Power Processing Breadboard activities. The objective of this contract is to deliver to MSFC a 20 kHz, 5 kW, AC power processing breadboard. The following progress was made during the period: a mid-term review was held on 10/28/85; work on the design phase progressed leaving the overall system design approximately 90% complete; approximately 85% of the parts which were to be required to complete the breadboard were ordered by the end of October and 60% of those ordered had been received. Problems and expenditures were also explained.	608-36429 PR2
	This is the third monthly progress report which summarizes the major program activities accomplished at Life Systems during the period 10/1/85 through 10/31/85 for the Refurbishment of One-Person Regenerative Air Revitalization System. During the month of October, the following significant activities occurred: completed fabrication of matrices; completed fabrication of module end plates & insulation plates; began fabrication of cell frames; received 80% of materials for the Electrochemical Depolarized Carbon Dioxide Concentrator (EDC) module & test stand; began fabrication of heat exchangers. The document gives details concerning these activities.	TR-875-2-3
85/11/13	This document is a report which produced in conjunction with a Boeing	BAC8-36526PMF

85/11/13 quarterly Project Management Review (PMR) of 13 November 1985. The following were discussed during this meeting, and consequently included the following in this document: Technical Management Information System, Common Module integration simulator, commonality, and integrated assembly study. The following significant accomplishments are listed as having taken place since the August 1985 review: Boeing Space Laboratory is operational; completed hydrazine thruster test; completed architecture trades; installed Intergraph equipment and training in progress; supported MSFC by submitting DR-19 data for RUR-2 and supporting numerous RUR-2 briefing meetings.

This document is the October 1985 monthly progress report of activities related to the Long-Term Lubrication Analysis. The objectives of this program included the performance of a complete tribology survey regarding the materials, environment, and operation characteristics of every point of contact in the Station subject to relative motion. Task activities during this period include: collection of Station documentation to support work breakdown structure development; initiation of formal communication between SRS Technologies and MSFC and other NASA centers requesting information on work package data packages and other supporting contracts; attending Preliminary Requirements Review on berthing/docking mechanism; and continuing efforts on the literature review. Problems, a financial summary, and anticipated work are also listed.

BCDB-36655 PR4

This fifth monthly progress report presents a description of program activities at UT-HS during the period of 10/1-11/1/85 in performing the SS LLFS program. The basic objectives of this program are to evaluate complex issues associated with SS LLFS, generate workable design configs which satisfy LLFS reqs, & manufacture test h/w suitable for evaluating & demonstrating maintenance technologies. During this reporting period the following significant activities occurred: continued maintenance reqs & methods study; continued component maintenance refinement; completed flight application assessment.

HSB-36626 MPR5

85/11/15 This document is a Boeing monthly report relative to work NASB-36526 completed on contract NASB-36526 for the period 1 October 1985 through 31 October 1985. The following topics are discussed in the document: integration; test, operations, and logistics; the Common Module; the Manufacturing and Technology Lab; the Lab Module; propulsion and vehicle accommodations; and business management.

2-B166-C6H-003

This document is a LMSC monthly progress report involving SS Thermal Storage/Refrigeration System Research & Development. The report period is October 1985. The document provides a background & introduction for thermal storage & refrigeration. Tasks for each of the 2 areas were also discussed. During this performance period, efforts were continued to define reqs for both the thermal storage & refrigeration. The following were topics discussed: refrigerants for vapor compression cycles; thermodynamic cycle analysis; thermodynamic property generation & cycle calculation; and, the financial aspects of the contract.

LMSC-F042708

This document is a October 1985 progress report for the Berthing Mechanisms activities. The following were listed as progressions in the reporting period: 1) a 2-day Berthing Mechanisms Program reqs review meeting was conducted at MSFC on 10/29-30/85; contractual portion of Phase I was considered complete, but continued to look at conditions of berthing/docking, including

MDCB-36417 PR5

DATE	ABSTRACT	ID NO.
85/11/15	center of gravity velocities module contact velocities; in Phase II, continued definition of design concepts for Berthing Mechanism & its components; in Phase III, evaluation criteria were being formulated for the various design concepts to be applied to berthing mechanism.	
	This document is a progress report for October 1985 on the Attitude Control Test Bed Modification and Refurbishment of Skylab's control moment gyros and other related equipment. The report describes the work performed during the report period and forecasted for the next month. Regarding modification and refurbishment of Skylab control moment gyros, engineering design, analysis, and drafting efforts were essentially completed on the inner gimbal assembly. Regarding the CMG/Sensor, the Test Bed Definition Document was submitted to NASA for comments. Work forecasted and current problems were discussed also.	BENDIXB-3640B PR5
	This document is the sixth monthly status report submitted in accordance with the reqs of DR-14. The period of time covered by the report is 10/1/85 through 10/31/85. This provides a summary of MMA activities in support of the MSFC SSP, which occurred during the reporting period and highlights activities occur will occur in the near term that are significant to the project. The major MMA activities during this reporting period were again directed toward synthesizing RUR-2 Trade Studies & Analyses to support NASA decisions & IRR DRs. The following are considered: SS disciplines, sys engineering, CM, LogM, MTL, P&VA, ADP, ops, logistics/maintainability, TMIS, and productivity.	SSP-MMC-00006
	This status report for the period 28 September through 1 November 1985 describes the progress on the Propulsion Technology Program, NASB-3641B. The objectives of this program are to provide a demonstration of hydrogen/oxygen propulsion technology readiness for the IOC application, specifically gaseous hydrogen/oxygen and warm hydrogen thruster concepts, and to establish a means to evolve from the IOC Propulsion System to that required to support advanced Space Station functions. Major accomplishments during this reporting period are the completion of the Task I Concept Selection Review on 24 October 1985, & the initiation of assembly of the accumulator module.	85RC17216
85/11/17	This document is a review of and provides recommended changes of document #JB400001, "SSP Product Assurance Requirements for SS Program" (7/18/84). This document is organized as follows: general comments in Section 2, specific comments on specific ideas or events are given in Section 3, and Section 4 presents the MMA comments made regarding the aforementioned document. The subject under discussion is safety, reliability, maintainability, & quality.	SSP-MMC-00018
85/11/18	The purpose of this analysis is to provide recommendations regarding an integrated approach to GSE commonality. The analysis methodology is to identify opportunities & develop strategies for the usage of GSE commonality to minimize the amount of GSE required & the costs of redundant design & development of test support h/w, s/w, & procedures. This is accomplished through the evaluation of preliminary SS designs & concepts for integration, test & verification, and investigations of viable applications of GSE commonality taking advantage of SS h/w, s/w, I/Fs, and reqs commonality characteristics. The term GSE (as used herein) includes all categories of GSE such as electrical/electronic, handling, transportation, servicing, & access equipment. This analysis will continue identifying & examining opportunities for the implementation of GSE commonality & providing related recommendations to support	EMS-S4.K.1

85/11/18 final GSE commonality decisions at SDR.

This document is a report whose purpose is to identify the reqs for a responsive, on-line interactive inventory management sys that will provide positive continuous control & accountability of SSP inventory assets for both on-ground & on-orbit applications. The following are covered in the requirement description section of the document: i/f reqs; inventory files; primary equipment; support equipment, on-ground & on-orbit; consumables expendables; spare/repair parts; developmental/test items; transaction files; receiving files; issue files; store files; disposition files; reports files; peripheral systems; inventory item coding label & label read sys; automatl materials handling & warehousing; computer systems; inventory management sys, h/w & s/w characteristics & general reqs.

LOG-MMC-00003

This document provides an integrated analysis of ground accommodations & storage for SS support at KSC. It combines & coordinates reqs from the WP Centers & Internationals, and, in so doing, satisfies the following EMS data products: Analysis of Ground Accommodations & Storage and Assessment of International Element Ground Accommodations. Included herein is a description of KSC capabilities which are available for SS support, overall KSC facilities planning for SS, and an analysis of those accommodation reqs identified by the WP Centers & Internationals.

EMS-53.K.1/S.7.K.2

This WP-02 document has the objectives of defining sys/ops reqs & a growth plan for WP-02 elements & systems to meet further functional reqs, and 2) defining integrated growth architecture including feasible growth configurations options, advanced technologies, issues, & integrated growth plan. The document includes a final set of integrated time-phased growth reqs for WP-02 program elements and final recommendations for all config growth concepts to match the time-phased growth reqs.

SSS85-0185

This WP-02 document, dealing with Growth Increments & Limits Definition, has the following objectives: 1)to define growth increments & limits for WP-03 elements/systems, 2)to establish total sys & specific config growth increments, & 3)to provide recommendations for replication based on total system impacts & program reqs. Two data products are included: Definition of time-phased SS growth increments & capabilities and definition of overall growth plan.

SSS85-0186

85/11/19 This document is Section 9 of a 9-section, 8-volume report submitted by GE/TRW to GSFC regarding their WP-3 study efforts. Sec. 9 is a review of the product assurance requirements for the SSP. This document covers the following areas in discussing SS management of product assurance: 1)defining the major product assurance tasks with respect to safety, reliability, maintainability, & quality & assuring that they are performed as integral parts of the design, development, fabrication, test, integration, & operational phases; 2)evaluating the safety, reliability, maintainability, & quality of h/w, s/w, & operations thru analyses, tests, reviews, & assessments; 3)providing timely status reporting & documentation of the product assurance efforts; & 4)establishing compatible req among manufacturing, test, launch, & ground operations sites. This document is to be used as basis for negotiating product assurance req w/SS contractors & as req document for NASA SS product assurance activities.

GE/TRW DR02 (S9)

85/11/22 This document is a progress report for the SS Automation of Common

MCR-85-706 1-5

DATE	ABSTRACT	ID NO.
85/11/22	<p>Module Power Management & Distribution Progress study for 6/25/85 thru 10/31/85. Accomplishments during this period include: evaluation of government-proposed reqs, h/w, s/w support packages, & operating sys for 2 computer sys that will interface w/common module power management & distribution controllers; started designing packaging for parts of the host computer environment; began compilation of list of 24 criteria for determining whether a given function should or should not be automated and for selecting among h/w automation, conventional s/w, & expert sys automation approaches. Potential problems, future activity, and contract financial status were topics of discussion also in the document.</p> <p>This WP-02 document gives discussions of Project 32- Non-Contact Man-Machine Interface & Project 33 Multi-User Interface. 2 I/F development areas are discussed in this document: 1) The application of voice recognition, computer vision, & other Non-Contact MMI devices that may be suitable for use in the SS, and 2) A methodology for producing useful conceptual descriptions of user I/Fs during the early phases of programs. Also included as part of the multi-user project include: identification of on-SS sys users; a candidate list of user tanks; and, formulation of an operational scenario built around identified users & tasks.</p>	SSS85-0180
85/11/25	<p>This document summarizes the progress made on the IRSS program during the period from 10/5/85 through 11/3/85. The work performed during the report period and the activities planned during the next report period are discussed. Technical & programmatic problems encountered are outlined, along with approach planned for resolution. The work performed during this period includes: sys interface definition discussion at a MSFC meeting on 10/25/85; research done in compliant control; evaluation of optical angle sensors & ultrasonic ranging continued; the redesign of the BL planning sys for AI planner was completed; work on computer architecture centered around deciding what specific microprocessor family offered the most technologically promising blend of current power & flexible future expandability. Future work and cost information were also discussed.</p>	MCR-85-654-4
85/11/26	<p>This document contains Boeing's evaluation of the applicable documents contained in Attachment C-7 of the subject contract. The preliminary review includes proposed substitutions, additions/deletions and recommended language changes deemed necessary to support the Phase C/D effort. The recommendations in the document are divided into 2 sections: 1) the applicable documents and 2) reference documents</p> <p>This WP-02 document is a report which constitutes the initial submittal of the PFMEA. The objective of this report is to assure compliance with the intent of reliability reqs of DR-12, NAS9-17365. The product consists of analysis criteria assumptions & groundrules, a description of the detailed approach for PFMEAs, a data req compliance matrix, & detailed methodology for conducting subsystem PFMEAs.</p>	2-8293-0000-021
85/11/27	<p>This report summarizes the technical progress on the Development of Structural Dynamic Analysis Tools Contract No. NAS8-36420 during the time period from 5 September 1985 to 5 November 1985. This report contains reports on activities in Tasks 1-3. Joints, trusses, and girders are discussed.</p>	BAC8-36420 PR3
85/11/30	<p>This document is a progress report for November 1985 of the Space</p>	MCR-85-618-6

85/11/30 Station Common Module Power System Network Topology and Hardware Development Program. The following topics were given attention in this document: network concept selection; network schematics; and program plan evaluation. Tasks A through C of this study were completed during this report period. Problems are outlined, and they basically are concerned with budgeting. Major objectives for work in December 1985 are outlined.

This document is an USRA monthly report which describes the activities of USRA under the SS Natural Environment Design Criteria Studies during the period from 11/1/85 through 11/30/85. The information given relates to the workshop which was held at the Carriage Inn in Huntsville, to which 62 attendees came. These were leaders in all phases of middle & upper atmosphere physics and modeling, as well as from NASA, the Navy, NORAD, & contractors.

USRA8-36400 PR5

85/12/01 This document contains appendices for the SS WP-3 Definition & Prelim Design Study carried on by GE/TRW. The following topics are covered in an appendix: AP-1--Preliminary Hazards Identification Analysis; AP-2--Evaluation of Thermal Control Service On-orbit Servicing Methods For Long-term Missions; AP-3--Scientific Rationale for Required 6-Level Environment; LB-1--Cyclically Harvested Earth/Orbit Production System (CHEOPS); LB-3--Internal Contamination Control Analysis; 6--Customer Accommodations Design Assessment.

GE/TRW-DR06

This document contains tables which represent the mission reqs as developed by WP-02. The reqs originate from the SSP Mission Req Data Base at LaRC. They report reqs for missions individually & for totals at SS locations or totals for the SS. Missions were created by MDAC for the purpose of these reports. These missions house reqs found in the special considerations sections of LaRC's data base. The P/L name for these missions discusses their relationship to their parent mission. The number of STS flights required is also used as criteria for the data discussed. Along with the OMV & DTV propellant, the logistics mass & equipment mass are used to figure the total number of required STS flights per year.

MDC-H2046

This document describes the effort & associated results of the International System of Units (SI) Impact Study. The major goal was to determine the technical, cost, and schedule impacts of incorporating the SI on the SSP. This document chronicles the approaches taken to reach this objective: develop/define program cost elements for which cost impacts would be determined; distribute BL program cost estimate by WBS; identify/define SI study cases for evaluation; assess the effect of the use of the SI units on each of the program cost element activities & the resultant cost impact; evaluate the availability of metric industry standards documents & specifications for standard parts, components, materials, processes; determine cost impacts for such metric products as standard metric parts and components, materials, perishable tools, and quality inspection equipment.

MDC-H2288

This document describes the JEM System/Subsystem requirements for System/Subsystem design in the Phase B study. The req in this document are limited to the IOC. Descriptions of growth req are for reference only. JEM system concept, program reqs, system reqs, & subsys reqs are discussed herein. Also included for discussion are system verification, GSE requirements, and option list.

SU-84032A

This document describes the Operation & Maintenance Information Sys.

MDC-ADP11-05/06

85/12/01 It evaluates the performance of an advanced computer-based paperless technical documentation data system for incorporation aboard the SS & STS. Two subtask reqs are addressed: analyze equipment suitability and adapt equipment h/w for environments. OMIS equipment (components), h/w testing, and problems are discussed as well.

This document discusses the NOS and its technology which is immature. An advanced development effort are to be necessary to bridge the gap when SS reqs are imposed. Two key reqs are covered in this report: 1) the NOS renders network transparent to applications through symbolic addressing & process-to-process message passing; and, 2) the NOS must perform dynamic reconfiguration to cover the network failures & must exhibit deterministic performance levels to the application. Two key design guidelines are specified: a layered approach following the ISO/OSI model & a NOS structure that permits use of a standard HDL.

MDC-ADP01-05

This document discusses the OMIS and its objective is to evaluate the performance of an advanced computer-based paperless technical documentation data system for incorporation aboard the SS & STS. The preliminary needs of OMIS are discussed and the components of the sys are given attention. OMIS sys h/w is listed. The Head-Up-Display is also given attention.

MDC-ADP11-01

This document discusses the Project Implementation Plan. It gives a list of applicable documents. It treats the following topics: Project management (WP management-business/technical, config, information data management); SE&I; design & development; manufacturing; product assurance; ops; logistics. The appendices to the document cover the following: A- Safety Plan; B- Reliability-Maintainability Plan; C- Quality Program Plan; D- PIP Subplan, ACS; E- PIP Subplan, DMS; F- PIP Subplan, C&T. See Books 2 & 3 of this same overall document.

MDC-H2288

This document establishes the method for accomplishing a FMEA and for preparing a CIL for the EPS of the SS & associated GSE. The FMEA identifies potential failure modes, assesses their effects on the EPS & the SS mission & ranks the effects by Criticality Category. FMEAs & CILs are a part of the design process. They will be provided for the EPS to 1)stimulate early identification of failure modes, 2)affect design modifications to minimize retention of items exhibiting critical failure modes, and 3)incorporate design improvements to ensure satisfaction of fail operational/fail safe/restorable reqs. ORUs are discussed.

R1/RD85-302

This document is a report concerning the Failure Modes & Effects Analysis. It reports on this analysis which is to identify & eliminate design deficiencies during the early design phase & to assure that safety, reliability, & maintainability reqs are not degraded as production designs become fixed. This document concerns the Phase B FMEA and it is an evaluation of WP-02 flight subsystems during the PNC orbital ops phase & will be conducted at the highest level ORU & within the ORU to pursue single failure points. DR submittals are scheduled for delivery on the following dates: 12/85, 2/86, 6/86, 10/86, and 1/87.

MDC-H2280

This document is a report containing the results of MDAC's applicable documents reveal task with recommended deletions, substitutions, modifications, including related rationale, which are considered to be cost effective to the

MDC-H2288

85/12/01 SSP.

This document is a report which presents the results of a 2-month long study conducted by B&T, Inc. for JSC. Discussed herein are comprehensive issues associated with determining the appropriate number, locations, sizes, materials, & other viewport features. Guided by these considerations, alternative design concepts to enhance operational utility, configuration flexibility, & on-orbit servicing are proposed. The purpose of this document was to provide information & concepts to assist NASA & contractors in assessing SS viewport reqs & options. Specific viewport issues discussed herein include: number & location; sizes & shapes; structures & materials; human factors considerations; safety & servicing features. Specific concepts addressed in the document include: structural/glazing; shielding/filtering; accessory equipment; servicing/replacement; & alternate/supplementary technology applications. Viewport precedents in the Mercury, Gemini, Apollo, & Skylab programs are pointed out.

JSC-32003

This document is a WP-02 EMS input for DR-19, DP-2.4B. The following topics are covered in this document: STS Performance capabilities & SS; resource reqs; DTC; Customer reqs; architectural concept; growth analysis; ADP; A&R; commonality; and, international participation.

MDC-H2044

This document is an assessment which has been prepared in response to SS WP-3 Project Implementation Plan (DR-10) req which call for an analysis of the impact of the use of the International System of Units in the conduct of this program. Presented here is an assessment of the impact of conducting the SS WP-3 program on the basis of the International System of Units. The overall impact was assessed through direct discussions with operating managers in the Engineering, Manufacturing, Quality Assurance and Materials Procurement Sections, consultation w/personnel associated w/the GE Metric Council, & reference to related literature. Metrication was also discussed in the document.

GE/TRW DR10-001

This document is Book 10 of a 26-book set and it specifically deals with Section 4.7 of the overall document. It describes the Mechanical systems & forms the initial input for presentation of subsys definition & prelim design data. Also included are reqs which configure the design, maintainability/safety considerations, test/verification approach, commonality considerations, and a risk assessment of the config. The section includes the following sys descriptions: rotary joint sys, solar alpha rotary joint, solar beta rotary joint, radiator rotary joint, coarse pointing sys payload gimbal, umbilical mechanisms.

MDC-2028

This document is Book 11 of a 26-book set and it is Section 4.8 of the overall document. The subject of this input is resource integration. Resource integration is responsible for the definition, analysis, & integration of major sys resources for the SS. This document is further concerned with the network distribution of these resources & the allocated space for the major resource subsys elements, i.e., resource equipment bays. The sys discussed herein include: ACS, power conditioning & storage, DMS, C&T, EPS, propulsion sys/fluids sys, centralized thermal HR&T sys & controls, and external EVA/ECLS equipment.

MDC-H2028

This document is Book 12 of a 26-book set and it covers Section 4.9 of the overall document. This document describes the results of work relating to the DMS which was performed during the sys definition phase of the SS Phase B contract. The objective was to provide recommendations & supporting information

MDC-H2028

85/12/01 for DMS BL considerations at the IRR. The document is divided among the following topics: DMS reqs; DMS trades & analyses results; BL DMS description (architecture, elements/components, schematics, documentation tree, performance analysis, I/F reqs, redundancy management/failure recovery, standard services - s/w); DMS MTA (unique reqs, design differences, growth-to-phase-in-to-PMC, added reqs for safety/maintainability/reliability); A&R; DMS CA; DMS test/verification (T&V, testing, DRUs, subsys T&V); DMS maintainability/logistics analysis; DMS commonality; DMS growth analysis; DMS risk assessment; analytical tools, models, & data base information; &, NSTS interface.

This document is Book 14 of a 26-book set and is Section 4.10 of the overall document. This document discusses SS Communications and Tracking. The following individual topics are discussed within this document: control and monitoring; multiple access; S-band; TDRSS; Radar; GPS; video; and, audio. Tables in this document show h/w placements, the sys component's size, weight & power, and C&T h/w weight & power for each launch of both the MTA and PMC.

MDC-H2028

This document is Book 19 of a 26-book set and discusses Section 5 of the overall document. SE&I Trades/Analyses are the subject of this document. The subtopics discussed herein: T&V approach; producibility analysis; end-of-life disposal approach; autonomy trade study; automation option/analysis; D&B analyses & trades; prelaunch assembly, I/F verification & ground servicing analyses; crew workstation analyses; fluid sys analyses. Appendices cover the following: Ops Function Tree, Cost & Risk Trades, and Recommended Autonomy Ops for Ops Functions.

MDC-H2028

This document is Book 21 of a 26-book set and it specifically deals with Section 6 of the overall document. This document deals with the SSIS. It contains trades & analysis on the following subtopics: commonality assessments, communications protocols/standards, command management concepts, ground sys concepts, security/privacy assessment, ops/engineering data base, core sys ops & management, p/l operational & sys management, operational/customer data flow, customer data base, generic controller commonality. Attachments include: specification of reqs for SSIS; subsys minispec for ECLS; reqs for traceability matrix; functional data sheets; SSIS functions lists; SSIS function allocation matrix; interface specification sheets; ground interelement interfaces specification sheets.

MDC-H2028

This document is Book 23 of a 26-book set. It specifically deals with Section 9 of the overall document. The subject of the document is Analytical Tools, Models, and Data Base Information. The document contains definitions of the 3 aforementioned topics. The bulk of the document is an attachment entitled MDC's Catalog of Space Station Analyses Tools; this catalog provides general reference information on all available tools.

MDC-H2028

This document is Book 24 of a 26-book set and it specifically deals with Section 6 of the overall document. This section of DR-02 summarizes the results to data of MDAC's I/F development activities, i.e., external WP I/F's & preliminary ICD's. This effort covers both external & internal end item I/Fs associated w/ WP-02. Included in the discussion are the following: study approach & results; identification of WP-02 interfaces; approach to Interface Control Documentation; developing interface reqs; and interface reqs documentation. Appendices to the document cover such topics as: IRDs for WP-02 I/Fs; IRDs for WP-02 to WP-01 I/Fs; IRDs for WP-02 to WP-03 I/Fs; IRDs for WP-02

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85/12/01 to WP-04 I/Fs; IRDs for WP-02 to external element I/Fs; IRDs for WP-02 to other element I/Fs; IRDs for WP-02 internal I/Fs; Equipment List & Change Log.

This document is Book 25 of a 26-book set and it covers Sections 11, 12, and 14-17 of the overall document. The topics considered are as follows: 11) Specification Tree; 12) Flight Parameters & Ops; 14) Man-tended Config; 15) SS Internal Pressure Selection; 16) NSTS I/F Analyses; 17) MDAC WP-02 Master Equipment List. Section 12 provides an analysis of flight parameters & ops to access their compatibility relative to mission user reqs for typical mission scenarios. Section 14 reports on the cost/benefits of MTA. Section 15 discusses a report the objective of which was to determine module pressure for the design of the SS & to identify associated sys & support equipment impacts. Section 16 identifies & discusses the SSPE/STS interfaces analyzed in trade studies. Section 17 contains a master equipment list required by DR-02, item F; pertinent assumptions, definitions, responsibilities, change procedures, & data base access/use instructions.

MDC-H2028

This document is Book 26 of a 26-book set and it discusses specifically Section 13 of the overall document. Customer Accommodations are the subject of the document. The following subtopics are discussed in the document concerning CA: P/L placement results (criteria, specific mission locations, p/ls on the Transverse Beam); P/L i/f results (SS mounting/umbilicals, pointing reqs, resource provisions to p/ls; P/L environment (AP contamination & micro-g reqs); P/L servicing (servicing categories, locations, accommodations, reqs); P/L handling & stowage; SS launch site P/L integration; payload/sys interface traceability; and, regional P/L accommodation. Appendices discuss the following: Privacy & security; ease of on-board s/w modification; transparency of SS data ops to p/ls; automated/transparent P/L command management sys; COP/SS interaction; and transportation integration.

MDC-H2028

This document is Book 3 of a 26-book set and it discusses section 3 of the overall document. Section 3 discusses the integrated sys overall config for the dual keel SS. The integrated sys overall config analyses are performed to refine & update the definition of the Reference SS to generate data to support the NASA IRR/SRR process that will lead to establishment of the BL Config for Prelim Design. This section presents the current definition of the Dual Keel SS sys overall config consisting of data developed to support the RUR-2 config selection effort. The subsections of this document concern themselves w/the following topics: reqs analysis; configurations; altitude analysis; CA buildup; mass properties analysis; ACS sizing, momentum management, & torque equilibrium attitudes; RCS data; P/L viewing; SA shadowing; module pattern orientation; SD option influence; integrated thermal; antenna location; micro-g; RMS; 5-meter truss impact; loads/structural dynamics; growth; proxops; keel spacing; radiation

MDC-H2028

This document is book 5 of a 26-book set and it covers Section 4.2 of the overall document. This book deals with connect/interconnect which includes the berthing mechanisms, nodes, tunnels, & hatches for the dual keel SS. This document is to present reqs, trades, analyses, descriptions, I/Fs, & related data for the prelim design. The subsections of the document deal with the definition & prelim design of the following: berthing mechanism subsys; node subsys; tunnel subsys; hatch subsys.

MDC-H2028

This document is Book 6 of a 26-book set and it covers Section 4.3 of the overall document. Its subject is the SS airlock. This document includes the

MDC-H2028

85/12/01 reqs, the airlock subsys description, a preliminary Interface Reqs document, preliminary CEI specifications, and discussion of many potential features & functions. These include the impact of the alternative MTA initial SS config option; the airlock potential for A&R, Commonality, & growth; and the plan for CA, refurbishment, contamination control, spares, risk, testing, and others. This document addresses the end item airlock exclusive of the EVA sys equipment which has been identified as a separate end item. It is the airlock as a containment element & includes the accommodations & interfaces for the EVA sys equipment & the distributed utility/resources sys equipment. The airlock study addresses, in addition to general & specific RFP reqs, derived reqs resulting from EVA sys detail trade studies.

This document is book 7 of a 26-book set and it specifically covers Section 4.4 of the overall document. It describes those analyses, trades, & prelim design data associated with the SS Thermal Systems- both active & passive. The report is divided into 2 sections: Section 1, Passive Thermal Control, and Section 2, Active Thermal Control System. Section 1 addresses component analyses for the truss structure, fluid sys, GN&C & mechanical sys. Section 2 contains those reqs analysis, results of both HR&T architectural trades & those trades conducted w/in the system itself, and a description of the recommended sys. Additional trades are reported on in the text as well as I/F reqs, ops & control, and maintenance & reliability. Approaches are given for MTA ops, A&R, test verification, commonality, growth, & risk assessment.

MDC-H2028

This document is Book 8 of a 26-book set and it covers Section 4.5 of the overall document. This data book is intended to be a total documentation of the SS GN&C sys. When completed at the the end of the Phase B Study, it will contain a complete definition of the GN&C sys including all supporting data & models trades & analysis results. Generally, the body of the report summarizes findings & presents key results & recommendations. For example, the objective, approach, significant assumptions, and key results & conclusions for each trade or analysis are summarized in Section 3. The document presents information relating to the dual keel SS.

MDC-H2028

This document is Book 9 of a 26-book set and it deals specifically with Section 4.6 of the overall document. It treats the mobile RMS. This document describes the MRMS & forms the initial input for presentation of subsys definition & preliminary design data. Included are reqs which configure the design, maintainability/safety considerations, test/verification approach, commonality considerations & a risk assessment of the config. The following are topics discussed in the document: mission/ops/sys/functional/environmental/ interface reqs; trades relating to mobility, 5-meter base stowage tradeoff, P/L handling, & need for RMS; descriptions of subsys (mobile base, RMS, power subsys, displays & controls, command/communication, CCTV subsys, thermal control, tools & end effectors, manned foot restraint manipulator, umbilicals); MRMS safety, reliability, & maintainability considerations are also considered; MRMS fail safe/fail op/DRU status; commonality; growth; A&R; development tool.

MDC-H2028

This document is the December 1985 FACC monthly progress report for the ARBC study. The month was mainly occupied mainly with the following tasks: a) completion of the conversion of the nonlinear simulation program; b) prelim documentation of the analysis & simulation development for the thruster controlled reboost mode; and, c) presentation of study overview & prelim results at MSFC, 12/11/85. Concerns of the prelim investigations for the reboost mode

FACC8-36422 PR6

85/12/01 are discussed, as are the major study results of the month. Reboost mode study results were discussed.

This document is the final product of a study on SS hatch concepts which was through JEC under contract to JSC. The following objectives were undertaken by this study, & consequently are reviewed herein: identify hatch planning guidelines, conceptualize & evaluate hatch closure alternatives, recommend preferred concepts, & undertake prelim design development. The types of information re hatches include: types of closures; general reqs of the hatch; hatch indexing positions; pivoting/sliding plates; Shuttle-type pivoting; opposing sliding doors; hinged plates (solid & single); hinged plates (bi-fold & shutter); deployable frames; accordian frame; inflatable hatches; self-sealing airbag; tube w/membrane; stowable plate & cover (bi-fold); bi-fold stowable frame; attachable viewing port; number of seals/closure; rejected & recommended options; hatchway/utility connections; closure mechanism; retrofitting; privacy screens; &, study recommendations.

JSC-32002

This document is the November 1985 monthly progress report for the ECLSS Integration Analysis Project. The following is included herein: a) quantitative description of work performed during the period; b) summary of work planned for next reporting period; c) summary of problems/concerns; d) summary of manpower expended in current month, cumulative manpower expenditures to date, estimate of physical completion of contract, & explanation of significant variances. The following items were completed during the period: general systems cluster model; oxygen recovery program; water recovery program; coolant loop program; BMR; H/W procurement; cluster equipment cooling; air temperature control & flow distribution.

MDC W5039-7

This document is the progress report for November 1985 for the SS Automation of Common Module Power Management and Distribution study. Work completed in November includes: completion of Task I-2, CM/PMAD function partitioning; a matrix showing functions & partitioning based on a list of 24 general rules, which may also be applied to functions that may be defined later; began studies under tasks I-3 & I-4; began h/w procurement under Task IV. Potential problems, future activity, & financial status were examined.

MCR-85-706-6

This document was prepared in accordance with the req of the SOW of WP-3. Each of the documents identified in paragraph 2 of SOW Attachment C-7 was reviewed against current SS criteria & appropriate recommendations have been made where it was felt that changes would be beneficial to the SSP. The primary beneficial driver was cost effectiveness. Each of the documents reviewed was the latest issue that was available at the time of this evaluation. The date and revision of each document has been identified under the Accession Number to preclude any misunderstanding concernig exactly which document was reviewed.

GE/TRW DR10-000

This is a preliminary reqs document for knowledge acquisition to support SS knowledge collection reqs during design, manufacture, and operation of SS subsystems. Included is a section entitled, "Operational Concept Document" which describes the mission of the Knowledge-Based Maintenance Expert Sys (KNOMES) and its operational & support environments; it also describes the functions/characteristics of the computer sys w/in the overall sys. Also included is a Software Req Specifications which establishes the reqs for the CSCI identified as KNOMES of the Knowledge-Based Maintenance Sys (KBMS).

MDC-ADP03-61

DATE	ABSTRACT	ID NO.
85/12/01	This is a report which documents CRUX III, an experiment flown on STS mission 41-G, to measure the cosmic ray upset of various memory devices. The data from this experiment, along with ground testing yet to be performed, will increase the understanding of how cosmic rays affect electronic components in space, and allow better predictions of soft upset rate. The space radiation environment which produced the single event upsets in the test devices is analyzed here to provide data for computer models to use in estimating the number of soft errors that should have occurred in CRUX III.	MDC-ADP02-02
	This report constitutes the final report on the Design and Development phase of the High Speed Communications Distribution Network advanced development project. It includes a status report on the existing 200 Mbps network, the design modification description for SS application, and a summary of future plans for this project as well as related work to be done by RCA. The purpose of the project under discussion is to develop a 200 mb/s fiber optic distribution sys to interconnect video, voice, and data signal sources to a number of users, to provide the capability to interconnect combinations of compressed video (full-frame rate & slow-scan), voice, and other data with total bit rates of up to 200 mb/s along with ability to support growth of up to 500 mb/s with the same architecture.	MDC-ADP18-01
	This report contains the reqs BL from the first NOS Advanced Development task, as well as the results of the survey effort. The survey shows that the SubACS NOS is the closest of any existing NOS to meeting all of the SS NOS reqs. The survey also shows that while many network operating sys follow the general layered structure specified in the ISO/OSI Model, few have chosen to use existing ISO-sanctioned protocols within their systems.	MDC-ADP01-06
	This report examines the major SS design drivers & assesses their impact on the considerations for radiation tolerance. This task will examine current & projected VLSI/VHSIC electronics based upon the radiation environment anticipated for SS & will categorize the applicable circuit technology candidates using test & model results to produce a radiation tolerance handbook. The report expounds upon the reqs for the SSP's reinforcing the need for evaluating a microelectronic device's susceptibility to radiation. It also discusses the effect they will have on the use of radiation-resistant electronics in the SSP.	MDC-ADP02-01
	This report identifies PA characteristics for WP-02. Principal emphasis is placed on mission capture & customer support capability & on resultant config & sys impacts. Two basic SS development modes were considered: PMC and MTA. An end-to-end assessment, which considered user-reqs from P/L definition & selection to operational deployment, was conducted to assure Phase C/D support of a compatible set of capabilities which optimize customer support while reducing both SS & user costs. 5 major thrusts, considered essential to cost-effective user support, emerged from this assessment: computer-aided customer integration, credit-based international participation, containerized P/L manifesting, nested onboard P/L support, and quasi-autonomous P/L ops.	MDC-H2046
	This volume of the SS Master Verification Plan defines the engineering activities which lead to the verification of WP-02 h/w & s/w and all WP-02 I/Fs. It provides direction to all MDAC engineering functions for implementing verification reqs into h/w designs & describes the implementation approach to inspection analysis, test, & demonstration for satisfying those reqs at a	MDC-H2027

- 85/12/01 minimum cost while maintaining acceptable levels of risk. It is the principal controlling document for all engineering activities for WP-02 verification activity. The test & verification effort for WP-02, including all WP-02 I/Fs & support equipment, is described in this volume. The volume specifically addresses the total engineering responsibility for design implementation of verification reqs & the subsequent engineering effort to accomplish WP-02 design & h/w verification.
- 85/12/02 This report summarizes the work accomplished in the Integrated Wall Design and Penetration Damage Control Study during November 1985. The objectives of this contract are 1) to develop an integrated module wall design for the Common Module that will meet requirements for internal pressure, launch and berthing loads, meteoroid and space debris environment and thermal radiators, and 2) to develop a penetration control plan to assess the effects of primary wall penetration and for module repair/replacement following impact. In this report, penetration predictions of the design evaluation computer program BUMPER 2.1 was made with existing test data. The beneficial effects of multilayer insulation were noted. The second version of the design evaluation computer code was on schedule. BACB-36426 FR6
- 85/12/03 The purpose of this document is to describe the WP-04 Electrical Power System (EPS) to the element of the Orbital Replacement Unit level in the context of its operation as part of the Space Station and the Space Platform. The scope of this preliminary document is limited to the Electrical Power System design for Initial Operating Capability (IOC). The focus will be on the one recommended reference case design for IOC. The document is divided among the following topics: Operations Groundrules and assumptions, intra-work package operations integration process, inter-work package operations integration process, and operations issues. 45300.100-DR7
- This document contains the information from the payload accommodation analysis completed to arrive at the payload requirements for the Dual Keel configuration of the Space Station. The results were compared to the power requirements given from LeRC. The Langley Mission Requirements Data Base was used as a basis for the analysis. The purpose of this document is to ensure that all of the payloads in the reference mission requirements are properly accommodated by the Space Station Program. 45300.100-DR6
- This document is a preliminary submittal of the Automation and Robotics Plan for evolving the Electrical Power System (EPS). This plan provides a detailed functional description of the uses of automation and autonomous systems for both photovoltaic and solar dynamic systems. A Power Management System (PMS) architecture is described in Section 6, along with functions, algorithms, and performance capabilities of the PMS. EPS functions such as control, diagnostics, load assignment and management, energy balance, and energy planning were examined, and a determination was made of the partitioning of man-machine roles. Using selection criteria listed in Section 7 candidates for automation are shown. Section 8 gives detailed descriptions of candidate PMS expert systems and describes the functions to be performed. A preliminary appraisal of type and level of robotics systems was given also. 45300.100-DR17
- This document is a submittal of DR-12 of WP-04, the Failure Mode and Effects Analysis (FMEA) Report. DR-12 provides a means of documenting contract study results of the preliminary FMEA. This initial submission outlines the 45300.100-DR12

85/12/03 defined study areas and proposed format for presenting the FMEA study results. Subsequent submissions will document contractor study results using the accepted preliminary FMEA format. Defined study areas include: applicable reference cases (3 configurations); applicable failure criteria; failure criticality classification; use of FMEA results; use of critical item list; and assumptions to be applied in FMEA.

This document is Book 2 of the "Preliminary Analysis and Design Document," and it discusses the Electrical Power System (EPS) of the Space Station and Space Platform. Book 2 contains Supporting Data. It is divided into five parts: 1) requirements and assumptions; 2) recommended requirements changes; 3) preliminary specification tree; 4) interfaces; and 5) tools, models, and data base definition. See Book 1 of this document which has the same document identification number.

45300.100-DR2

This document is divided into two major sections which cover DR-10 of WP-04. The first section deals with an Applicable Document Review, and this report covers the preliminary task of applicable document review, in support of development of the Project Implementation Plan. Information contained herein reports progress and recommendations. The second part of the document deals with the International System of Units Impact Study; this study reports the impact, cost, schedule, and interfaces associated with utilizing the International System of Units (SI) in the design, development, manufacture, test, and operations of the Electrical Power System of the Space Station and Space Platform.

45300.100-DR10

This document is prepared to provide NASA with the estimated cost expended for the Man-Tended Options study and the Automation and Robotics Plan. These data are presented in a monthly time-phased schedule in TRW hours and total-burdened dollars including subcontractors. A separate schedule for each statement of work is provided. As of this report period, 12.1% of costs incurred had been expended on the Man-Tended Options study and 12% expended on the Automation and Robotics Plan.

45300.100-DR20

This document is the first submittal of DR-02 (WP-04), "Preliminary Analysis and Design Document." This submission is organized according to the table of contents of the document. The following are topics of discussion: 1) introduction; 2) executive summary which provides details concerning the Electrical Power System (EPS) of the manned Space Station and man-tended Station; 3) summary of design optimization studies; 4) systems analyses and trade studies; and 5) summary of preliminary design data. Also covered is a summary of the Phase B studies made to date for the EPS, Space Platforms, and the man-tended and permanently manned Space Station.

45300.100-DR2

This document is the LMSC November 1985 monthly progress report which describes work time spent on SS Contaminant Control Analysis Computer Program, on Microbial Monitoring, & on reviewing the effect of the Spacelab D-1 mission aggregate trace contaminant assessment on the prelim LMSC SS load model.

LMSC/F071326

This document is the seventh monthly progress report on the Non-Contacting Slip Ring Program. The following were accomplished in November: checkout of all digital circuits, half duplex only; build up analog boards, half duplex, & started checkout- made output offset adjustments, eliminated some noise sources, & added input gain adjustments. Plans for the next reporting

SE018-36416 PA7

85/12/03 period, as well as total expenditures & obligations are given.

This document summarizes the recommended evolutionary growth for the Space Station. Only growth beyond Initial Operating Capability (IOC) is treated. Mission scenarios, requirements, assumptions, particularly with regard to IOC and growth quantity sizing, are presented in Section 2. Space Station growth options which were considered are briefly discussed in Section 3 with references to the DR-19 data packages. Section 4 summarizes TRW's recommended growth concept (an IOC, completely photovoltaic Space Station, which post-IOC addition of solar dynamic, to result in a hybrid configuration.) The growth costs are covered in Section 5.

45300.100-DR18

This is a WP-04 submittal under DR-16 which contains the preliminary version of the development, test and verification plan in DR-16. This software development T&V plan contains the background, purpose and scope of the elements of the Space Station. Section 2 contains operation concepts and features; these features are regarding policies, methodologies, philosophies, concepts, and various tools used throughout the life-cycle of software development. Also it describes the recommended software policies based on TRW's experience. Section 3 describes the software development life-cycle phases and tools of a model. Section 4 covers the management approach for the software development project. Section 5 covers the configuration management standards. Appendix A is a suggested user requirements form. Appendix B covers the selection of the standard programming language for Space Station application. Appendix C covers the list of references.

45300.100-DR16

85/12/04 This document is a monthly progress report for the period of November 1985 for the SS PLIMP/Contamination study. The objective of this is to develop an improved set of plume/plume impingement codes which would advance the state of the art & improve the accuracy of calculated plume-induced design environments for the SS. During this period, the PLIMP code was successfully executed on the VAX 11/780 using the geometry from the PLIMP Interim Input Guide & on an RCS flow field generated with the VAX RAMP2F code. Impingement computations agree with results obtained using Interim PLIMP code on the Univac System. Future work and a financial statement are given.

LMSC-F042726

85/12/05 This document establishes the reqs for the content, operational features, & support capacities for the software support environment for the EPS WP. It also identifies the methodology by which this s/w support environment will be utilized for the development, test & integration of all the s/w included in the WP & an estimate of the timeline & resources to be utilized for that function.

RI/RD85-311

This document is a monthly progress report of activities in NAS8-36585, Rotary Joint Mechanism Test Bed, for November 1985. The following was included as work undertaken during this period: simulators Load Torque Motor were modified to accommodate recommended design changes expressed at Preliminary Design Review in September; detailed fabrication drawings of the Load Torque Motor had been started. Work to be performed during the next month included completion of the detail fabrication drawings of the Load Torque Motor and begin detailing of the truss support structure.

CE8-36585 FR6

This WP-04, DR-06 document deals with CA. Sect. 1 contains an intro. Sect. 2 is a brief overview of the PMAD subsys of the EPS which gives the reader

RI/RD85-310

DATE	ABSTRACT	ID NO.
85/12/05	a better understanding of the PMAD sys & how CA fits into it; power distribution load centers, remote power controllers, & load management are discussed; this section is included to give the reader a better understanding of the PMAD sys & how CA fits into it. Sect. 3 discusses CA on the SS in detail, including technical considerations, design considerations (customer security, P/L integration & checkout, P/L config change, P/L servicing, p/l packaging, customer constraints, utility power/standardized, modularized power trade-off). Section 4 discusses CA unique to the SP.	
85/12/06	Described in this document are the results of a study to determine the feasibility of using metric standards on the SSP. The assessment of using metric standards to implement a SS hybrid metric design is described with a discussion of how various program areas would be impacted. This document is in response to DR-10. The study considers the contractor's assessment of the state of metric conversion at the national level, within the Government, within the aerospace industries, and at the contractor's facilities. The study reveals that a metric hybrid design is feasible for the SSP; however the use of only metric dimensioning & standards will produce a more consistent product. Procurement costs of the standards is considered.	D483-50035-1
	In this document operations planning ground rules, reqs, & assumptions are defined. Philosophies under which orbital operations are to be accomplished are discussed. Prelaunch activities, maintenance, & logistics, resupply & recycle plans are summarized. The purpose of this document is to provide the approach for all phases of orbital & ground ops specifically related to WP-01's activity. Support equipment reqs will be provided for the following: module, nodes tests; subsys test, integration & checkout; LogM outfitting, installation, checkout; MTL outfitting, installation checkout; MTL & LogM prelaunch processing.	D483-50052-1
	The objective of this document is to evaluate power system growth increments and limits relative to customer reqs. Both solar PV & solar dynamic power generation options are evaluated. Key drivers and issues for selection of the power generation type, solar PV or solar dynamic, and for defining the growth configuration and block changes are: 1) System cost; 2) technology readiness; 3) Customer power reqs & schedule; 4) projected area & drag; and, 5) Overall span & sweep of the configuration.	SSS85-0200
	The objective of this document is to prepare a PIP and associated annexes for each STS flight in the assembly sequence. To be included are equipment lists, mass properties of p/l's, attach points, flight dates, EVA reqs, orbit parameters, & other PIP-required data. This document presents the methodology necessary for accomplishment of the foregoing. This methodology is being developed to identify the reqs necessary for integrating the STS and the SS system. Also investigated are the integration reqs for the assembly of the IOC config for each flight required to launch, assemble, & activate the SS in the nominal design reference orbit. SSS/STS will be investigated for interfaces that result during: SS assembly unit packaging, payload integration & cargo integration, cargo checkout & deployment, assembly & activation, and mission aborts.	SSS85-0192
	The objective of this document is to provide verification of incremental SS capabilities relative to time-phased mission requirements. The document contains mostly bar graphs which indicate the requirements of near-,	SSS85-0196

85/12/06 mid-, and far-term power mission categories.

The objective of this report is to define & describe the integration of p/l's falling outside the physical & performance envelopes established to fulfill adequately the majority of mission reqs. The scope of this report concerns the power, the OMV, the OTV, the crew, the LIDAR, and the structure requirements. The major options presented are time-phasing of experiments for power, reducing requirements for OMV, reworking crew hours, placing the LIDAR on a node aft of the modules, and adding structure for large p/l's in the velocity vector or on the lower boom.

SSS85-0193

The overall objective of the study reported upon in this document is to define the options for cost savings through identification & selection of common hardware, software, support equipment, standards, procedures, and training as defined by NASA's RFP and other related documents. The product of this study is the identification of commonality candidates, their applications across all applicable segments of the SSP including the common module and their impacts in terms of cost & technical risk. This document finalizes the list of Common Module commonality candidates to date, as determined through the analysis of the following systems/subsystems: power conditioning & distribution; communications; ECLS; thermal control; data management; and, structures & mechanisms.

SSS85-0202

The overall objective of this SS/SP commonality analysis is to define the options for cost savings through identification & selection of common h/w, s/w, support equipment, standards, procedures, & training, as defined by the NASA RFP & other documents. The scope of the effort encompasses both co-orbiting & polar orbiting SPs. The product of this study is the identification of SS/SP commonality candidates, their application across all applicable segments of the SSP, and their impacts in terms of cost & technical risk. This document finalizes the list of SS/SP commonality candidates, as determined through analysis of the following systems/subsystems: C&T, DMS, service accommodations, GN&C, structures & mechanisms, AP accommodations, power generation & distribution, propulsion, thermal control, operations planning, SLM, environmental protection, berthing/docking, personnel provisions, and EVA.

SSS85-0203

This document contains data to support WP-04 power option trade studies. Included are drag areas & accelerations, orbit decay lifetimes, and reboost requirements for MTA, IOC, & growth SS dual keel configurations.

SSS85-0204

This document contains the following: final definition of AP accommodations based on overall config and final recommended definition of PA including gimbal system which provides coarse pointing gimbal drive system, power/control data/fluid transfer elements & structural attach interface to mass structure & payload.

SSS85-0198

This document describes the conceptual approach for prelaunch ops at KSC for WP-01 h/w elements of the SSP. These h/w elements include the outfitted MTL, LogM, propulsion subsys, & SS accommodations for the OMV & OTV. This planning is designed to be compatible with STS p/l processing capability of KSC. This prelaunch plan is prepared for application in the subsequent Phase C/D phases of the SSP. This document is identified as Appendix A to the WP-01 SS Operation Plan. The processing under consideration includes: prelaunch assembly, test & checkout; integration & launch of initial & growth SS elements & p/l's;

D483-50052-2

DATE	ABSTRACT	ID NO.
85/12/06	recovery ops; refurbishment; maintenance; reconfiguration; integration; test; checkout; & launch of cyclical resupply elements.	
	This document is a Phase B prelim plan describing the conceptual approach, organization & management, & methods by which on-orbit maintenance reqs will be satisfied & integrated into the total SS support sys. Design goals of the SS are discussed. This document will provide a BL from which other WP-01 on-orbit logistics support reqs are identified. The procedures, guidelines, & policies set forth in this document apply to all Level C NASA Centers, prime contractors, & customers having management and/or technical responsibility for SS WP-01.	D483-50052-4
	This document is a progress report for October & November 1985 regarding the Solar Alpha Joint Design. The following were accomplished during this time period: prelim designs were completed & presented at a PDR at MSFC on 10/28-29/85; in Nov., efforts were directed toward finalizing the design of the 108-inch bearing & the transition structure to freeze the design interface; the electronics design has been changed to 28 VDC; and, sys design was completed & simulation show acceptable performance.	D483-50052-5 SPERRY8-36415 PR3
	This document is a report which begins in section I by re-examining the SE&I A&R analysis tool reqs & schedule & measures of progress needs in the context of the SSP convergence process. In section II three major topics are addressed: SE&I analysis tools for A&R, draft guidelines for A&R implementation, & design knowledge capture in computers. In section III Level B evaluation of Level C RUR-2 data received on A&R is presented: first in summary, then in WP. Section IV presents an outline of the draft A&R Implementation Plan Update. The appendices relate to SE&I analysis tools.	JSC-B-RUR2
	This document is a report which provides a conceptual design for the DMS. The major areas to be addressed are networks, processors, data storage, crew workstations, services, fault tolerance, & maintainability. The following aspects of the conceptual design process are discussed: definition of reqs, interface reqs, subsystem functional decomposition, man-tended & IOC approaches, and trade studies. The document consists of 7 subsections: 1) Req Summary; 2) DMS Functional Diagram Overview; 3) DMS Conceptual Design; 4) DMS Redundancy; 5) DMS Maintainability; 6) DMS Hardware Utilization List; 7) Next Step.	SSS85-0195
	This document is the initial & prelim release of the Orbit Ops Plan for the SS, WP-01. It responds to Phase B statement of work for WP-01, DR-07, Ops Planning. The plan describes present concepts & configs for SS assembly, outfitting, & integration activities & the ground mission support ops anticipated for orbital ops phase. This plan defines the SS assembly phase & ops phase conceptual plans for WP-01 h/w elements on-orbit; this includes the basic sequence & support for the SS's initial assembly, activation, checkout & operation.	D483-50052-3
	This document is volume I of a 3-volume document which comprises Data Package 3.3/4 of the Time Phased SE&I Study Products deliverable to GSFC. This particular volume concerns itself with Requirements Themes of the SSP EMS. The following are considered under the Requirements Themes: R1- STS performance capabilities & SSP implications; R2- SS operations reqs; R3- resource reqs; R4-	6E/TRW-DR19-DE3.3

85/12/06 design to cost; R5- customer reqs; R6- safety; &, R7- standards. The document also discusses SE&I, attached P/Ls, the SLM, servicing, and platforms as they relate to the above.

This document is volume II of a 3-volume document which comprises Data Package 3.3/4 of the Time Phased SE&I Study Products deliverable to GSFC. There are 6 themes related to configuration which are dealt with in this volume: architectural concepts, growth, module pattern/size, customer accommodations, power option, and function allocation. Within each subtheme, the following compose the outline for discussion as they relate to configuration issues: SE&I, attached P/Ls, the SLM, servicing, and platforms.

GE/TRW-DR19-DP3.3

This document is volume II of a 5-volume set concerning the SSIS.

SSS85-0189

This document provides the descriptions & illustrations for the specific SSIS architecture which support the reqs & interfaces in Volume I. The topology & architectures presented are for the SSP IOC phase of operation & also provide for an orderly & manageable SSIS growth & expansion beyond IOC. Sections & their functions: 4- defines SSIS topology for space & ground elements; 5- identifies external SSIS space elements with which SSIS interfaces; 6- identifies external SSIS ground elements which which SSIS interfaces; 7- defines functions performed by SSIS ground elements; 8- defines functions performed by SSIS space elements; 9- identifies interfaces b/w SSIS & non-SSIS space & ground elements; 10- defines h/w & s/w architectures for SSIS ground elements; 11- defines h/w & s/w architectures for SSIS space elements; &, 12- describes major operational scenarios for end-to-end flow of data through SSIS.

This document is volume III of a 3-volume document which comprises Data Package 3.3/4 of the Time Phased SE&I Study Products deliverable to GSFC. This document takes the following seven strategies themes as the basis for discussion: ADP, A&R, logistics, commonality, maintainability, verification, and international participation. Each of these themes are discussed in terms of how they relate to the following subthemes: SE&I, attached P/Ls, the SLM, servicing, and, platforms.

GE/TRW-DR19-DP3.3

This document is volume III of a 5-volume set regarding the SSIS. This is the Interface Requirements Document and it provides: a) the identification & definition of the functional interfaces b/w ground &/or space-based SSIS elements & subsystems; b) the definition of performance, procedural, data & communications flows, programmatic parameters which characterize the functional interfaces; &, c) the identification &/or definition of the standards, protocols, & formats for the data & communications flows. Section 4 provides an initial identification of SSIS standards required to support SSIS service subsystems. Section 5 identifies the general connectivity b/w ground- & space-based elements, and the specific connectivity b/w those elements with respect to the unique SSIS operation scenarios they support.

SSS85-0189

This document is volume IV of the Communication and Tracking Report.

SSS85-0191

It is an appendix which provides detailed results of the seven multiple access communications trade studies. It also contains the results of additional studies relating to multiple access architectural tradeoffs, link analyses, frequency interference studies, & a detailed analysis of optical approaches for the IF distribution network. Specifically, this appendix presents the analyses & trades results used to derive the recommended techniques for closing the communication links which comprise the SS C&T Multiple Access Subsystem.

DATE	ABSTRACT	ID NO.
85/12/06	<p>This document is volume V of a 5-volume set regarding the SSIS. It presents the functional & performance reqs for SSIS, both explicit & derived. It documents the rationale & analyses, provides the impacts & assessments, & presents the trade studies, which were used to arrive at the recommendations contained in Volumes I thru III. Section 1 discusses specific trade studies. Section 2 addresses more general analyses or impacts/assessments; and, Section 3 addresses the SSIS architecture/analysis results from WP-03.</p> <p>This document presents the power option impact on ACS design, gimbal system design concepts, and comparison & trade results. Also treated herein are the following topic-matter: PV SA, solar dynamic system, CM6, RCS.</p> <p>This document reports on the study of the launch packaging and the assembly sequence & operations of the EPS for the revised reference dual keel SS. The analysis considers only the BL PV SA coupled to the regenerative fuel cell (RFC). The materials presented in this document cover the assembly sequence & operations in general but the emphasis is placed on the EPS generation subsys.</p> <p>This document serves to identify the subsystem WP interfaces which best further the SSP. The following topics are discussed: performance, reliability, maintainability, qualification, common interfaces, partial SS assembly, interface verification, growth.</p> <p>This EMS document provides the prelaunch & postlanding ground processing ops data for the WP-02 SSS end items. 5 basic tasks were identified & undertaken: 1) identify prelaunch ground facility options, storage, GSE; 2) determine specific ops required to integrate, test, check out SSPEs & P/Ls; 3) determine specific ops required to refurbish, maintain, & reconfigure cyclical element processing; 4) determine basic sequence of ground processing ops for initial & growth SSPEs; 5) describe the types of verification programs & methods required to assure modifications & upgrades are functional prior to launch. Selected logistics & resupply, assembly, test & verification, maintainability & CA study results are incorporated into this EMS.</p> <p>This EMS theme document provides to WP-01 resource reqs for ECLSS, volume, and fluids; and to WP-04, power reqs for WP-02 subsystems. ECLSS reqs provided include hygiene, EVA, safe haven, & thermal reqs. Volume reqs presented contain the equipment lists from the WP-02 subsystems which have equipment within modules, airlocks & nodes. Fluids reqs presented include the reqs of the ECLSS, payloads, SPs & satellites, and material processing.</p> <p>This is volume I of the Preliminary Analysis and Design Report. This section presents the requirements applicable to WP-02 for manned & MTA SSs. A refinement process of the WP-02 reqs, using RFP C-2, C-3, & C-4 as the points of departure, is described in sections a.1 thru a.4. The objective of defining the detailed SSP reqs applicable to WP-02 is to support NASA/JSC in establishment of the BL reqs. The BL sys, change control sys, & requirement change request.</p> <p>This is volume II of the Preliminary Analysis and Design Report. The purpose of this section is to present a status of the trade studies that were currently in progress & the results of those trade studies & analyses that have been conducted. The following are included as topic of discussion: commonality, AMR, h/w operating life, maintainability, architecture, docking/berthing, contamination, dynamics, p/l pointing, growth, productivity, fluid sys, checkout, safety,</p>	<p>SSS85-0189</p> <p>SSS85-0194</p> <p>SSS85-0199</p> <p>SSS85-0205</p> <p>SSS85-0210</p> <p>SSS85-0197</p> <p>SSS85-0188</p> <p>SSS-0188</p>

85/12/06 logistics, test & verification, CA, EVA, servicing, module pattern, EPS, MMF, crew size, microgravity, truss, interconnects, active thermal control.

This is volume III of the Preliminary Analysis and Design Phase Report. It is divided into 3 sections. Section C describes the effort in the definition of prelim interface data to support the development of a SS I/F reqs data base leading to the development of IRD and ICD. WP-02 I/F Dictionary, Subsys function I/F Block diagrams, subsys h/w locations, i/f analysis, functional analysis, future plans are discussed. The objective of Section D is to develop a specification tree that identifies the specification & their types that can be used to describe WP-02 as a CEL. The SS specification tree provides the breakdown description of the control documentation required to describe the SS WP-02.

SSS85-018E

This is Volume IV of the Preliminary Analysis and Design Phase Report. This document describes the overall config, assembly trusses & structures, connect/interconnect of modules, airlock, heat rejection & transport, GN&C, mechanical sys, resource integration, DMS, C&T, habitability/man systems, EVA sys, & STS interface/berthing. The purpose of this volume is to present the definition & prelim design of the WP-02 end items. Each section in this volume is based on the dual keel power tower manned reference config.

SSS85-018B

This report defines the SS sparing approach for WP-02 systems support activities associated with repair & replenishment. In this study, special emphasis was placed on the methods & techniques for provisioning spares & the process for selecting the candidates for repair & replacement. The overall objective of this study has been to identify an asset-selection process for orbital & ground-based hardware & to define a cost-effective method of provisioning spares.

SSS85-0201

This report describes the work during November 1985 on the prototype control moment gyros (CMG) effort and forecasted for the next month with an indication of current problems and proposed corrective action. Work performed during this period includes: preliminary design effort continued in preparation for Preliminary Design Review (PDR); engineering detail design analysis and drafting activity continued on inner gimbal assembly; completion of overall CMG preliminary design layout; build up of needed local circuit breadboards was in progress. Forecasted work for December 1985 consists of continuing the detail design of the CMG and its test equipment, pending PDR.

BENDIX-36628 PR5

This WP-02, DR-02 document concerns itself with the SS C&T system. This report reviews the reqs & I/Fs for P/Ls associated with SS free-flyers & COPs. The different P/Ls will cover experiments in solar & ground observations, material fabrication, space plasma studies, atmospheric studies, development of new processes & materials, and others. Some of the p/l's considered will be long-term attachments to the SS & some shorter-term. Power, weight & volume, IVA, & EVA are some of the reqs considered. Given attention are types of different data which p/l's output, such as scientific data, telemetry, & digitized video. Included are the following: End-to-End C&T Architecture Study, On-board C&T Subsystem Architecture, Tracking Subsystem, BL recommendation, Documentation, MTA, physical architecture, req change requests, & description of Tools and Models.

SSS85-0191

This WP-02, DR-02 document deals with the subject of the SS C&T

SSS85-0191

DATE	ABSTRACT	ID NO.
85/12/06	<p>system, specifically with a discussion of the development of representative SS multiple access communication links scenarios. These scenarios have been developed for the purpose of sizing the multiple access communication sys hardware. The types of scenarios discussed for the most part involve routine operations which follow detailed mission time lines. Descriptions of the types of operations involving communications with EVA/EMUs, shuttle, & free-flyers are also given, as are descriptions of MRMS and DMV.</p> <p>This WP-02, DR-02 document discusses the C&T system. The report includes presentation of the current best estimate of C&T system requirements, the associated baseline, and some variations of the baseline.</p>	SSS85-0191
85/12/08	<p>This report summarizes the work accomplished on NAS8-36586, "Protective Coatings Development", from 10 October through 10 November 1985. The goal of the work effort is to ensure technology readiness for Station external surface materials which are exposed to the combined effects of electrons, protons, solar radiation, atomic oxygen, micro-meteoroids, and space debris. The following program accomplishment task elements are discussed in the document: candidate material environments; performance requirements; critical technology; development/testing; demonstration of technology; material usable specification; and materials data base development.</p>	BAC8-36586 TFR3
85/12/09	<p>This is a monthly progress report for November 1985 dealing with the SS Structures Development activities. Work performed during November 1985 and work planned for December 1985 will be described in this report. In addition, the cumulative cost to date, estimated cost to completion, & the estimated percentage of work completed are given. During November, work continued on Task 1, Development of Alternate Deployment Systems, & Task 3, Assembly of Structures in Space/Erectable Structures. In Task 1, the Semi-Manual Tool & Linear Motor deployers were studied. In Task 3, ops & reqs studies were completed in November for pallet-mounted & erectable module-to-truss assembly structure configs. Provided also is a flowchart for module attachment. Utilities I/Fs with common modules are also examined.</p>	RIC8-36421 MR6
85/12/10	<p>This document is a progress report for work done in November 1985 on the Refurbishment of Three Axis Attitude Motion Simulator activity. The report covers the progress of NPL, Sperry and Air & Hydraulics. Refurbishment of Three Axis includes electrical-mechanical repair of the existing Hydraulic sys, Table Servo Motor/Actuator Sys, and Electrical Power & Instrumentation Cable Wrappers. H/w modification, system integration, system test procedures development, technical support functions, and technical data & documentation activities are reported upon herein.</p> <p>This document is presentation material used at an MDAC Contract Management meeting on 12/10/85. The following topics were discussed at the meeting: Contract Management- schedule status, recommendations for reducing documentation workload; technical items- planned activities(IRR/SRR), sys/subsys definition, growth analysis, SD power sys integration, radiation analysis, A&R, failure tolerance, P/L servicing; Advanced Development, discussion of R. Malow's visit; Open action item status (CMRs, technical directives).</p> <p>This document is the November 1985 monthly progress report of activities related to the Long-Term Lubrication Analysis. The objectives of this program include the performance of a complete tribology survey regarding</p>	SCB-36409 FR4
		MDC-W2038
		BCDB-36655 FR5

85/12/10 the materials, environment, and operation characteristics of every point of contact in Station subject to relative motion. Progress included the following: collecting documentation to support work breakdown structure for development of moving mechanical assemblies; continuing formal communications with MSFC and other work package centers to request information on Station Advanced Development projects; attending interim review of Orbital Equipment Transfer Techniques; developing preliminary work breakdown structure for selected moving mechanical assemblies; defining preliminary tribology survey data requirements; performing a preliminary tribology review of alpha rotary joint mechanism; and continuing efforts of the literature review.

This document is the progress report for November 1985 for the SS Power Electronics Capacitor Development activity. The following accomplishments were made in the reporting period: 1) lead attach was completed of the single capacitor sections which are being used to evaluate processing variables; 2) the testing was completed to determine the optimum winding extension and dielectric cure/end spray sequence; 3) DC life tests were started to determine the effects of metallization resistivity & winding tensions on capacitor reliability. Work planned for the next period is also outlined.

SEC8-36437 FR5

This document is the progress report for the ADSS study effort for the period from 11/11/85 through 12/11/85. Fabrication & assembly of the prototype mass analyzer (velocity filter) continued and testing was initiated. Additional system & component design drawings were developed and/or finalized for the ADSS Design Review in January 1986. Problems, future activities, and funding are also discussed.

MCR-85-646-6

This WP-04, DR-10 document is divided into 2 sections. The first section is an Applicable Documents Review which reviews documents focused on enhancing the cost effectiveness of the SSP & applicability to Phase C/D of the EPS WP-04. The second section deals with the subject of metrication of the parts of the SS. The study presented here examines the various subsystems of the SS EPS with respect to the impact of utilizing the international system of units.

RI/AD85-309

85/12/11 This document contains Boeing's recommended changes to Mission, Operations, and Systems Requirements (C-2, C-3, and C-4) and is submitted in response to the subject data requirements. Recommendations were made concerning the following: update of Space Station/Orbital Maneuvering Vehicle mission model in Space Station Operations Requirements Document; Space Station Program Definition Requirements document; incorporate Industrial Space Facility reference configuration; Orbital Maneuvering Vehicle/ Orbital Transfer Vehicle/ SMART front end reference configuration; revision of anthropometric requirements; revision of particulate requirements for habitable volume atmosphere; reevaluation of crew radiation dosages; and relaxation of requirements for treatment of pulmonary embolism.

2-8293-0000-02*

This document is a report produced in conjunction with a Boeing Project Management Review held on 11 December 1985, and the topics discussed herein are those which were part of the agenda at the meeting. The following topics were discussed at the meeting: test and operations; propulsion and vehicle assembly; Common Module; Logistics Module; Manufacturing and Technology Laboratory. Significant accomplishments during this time included: activation of the HP 1000-ARTEMIS, activation of an IBM 4381, completion of RUR-2, support of the Interface Requirements Review (IRR) planning, participation in MSFC IRR

BAC8-36526PMR 12/85

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85/12/11	Decision Team activities, Boeing facility site at Huntsville/Madison County Jetplex was dedicated, conducted neutral buoyancy tests investigating on-orbit maintenance of external module elements, and conducted Boeing Internal Design Review.	
	This document was produced to accompany a meeting for the SS Definition & Prelim Design, WP-01 PMR. The following were discussed at the meeting: SE&I, MTL, P&VA, & LM. TMIS facilities, MTL, electrolysis propulsion, SS integration, ECLSS, and architecture. Diagrams are given of the NASA RUR-2 Twin Keel Config (IOC).	SSP-MMC-00034
85/12/12	This status report for the period 2 November through 29 November 1985 describes the progress on the Propulsion Technology Program, NAS8-36418. The objectives of this program are to provide a demonstration of hydrogen/oxygen propulsion technology readiness for the IOC Station application, namely gaseous hydrogen/oxygen and warm hydrogen thruster concepts, and to establish a means to evolve from the IOC Propulsion System to that required to support advanced Space Station functions. Major accomplishments during this reporting period are the completion of the Critical Design Review and the completion of the accumulator module & the computer controller.	85RC18345
85/12/13	This document is a LMSC monthly progress report on SS Thermal Storage/Refrigeration System Research & Development. The report period is November 1985. The LMSC portion of the report discusses a minimal amount of work which was done regarding the thermal storage. The bulk of the document concerns the SRS Technologies work on the SS refrigeration system. The following were discussed: the development of a procedure to determine relative performance of candidate refrigeration sys; refrigeration reqs; comparative performance evaluation procedure for candidate refrigeration sys; power required for thermoelectric refrigerator/freezer; weight penalties; vapor compression sys; heat rejection.	LMSC-F042740
	This document is the report of Boeing activities relative to the Space Station NAS8-36526 study for November 1985. This report is organized by module and function manager. The following took place during the period and are dealt with: IBM 4381 was delivered to MSFC; HP10000-ARTEMIS system was delivered to MSFC; RUR-2 was completed; IRR planning was begun; Boeing facility sit at the Huntsville/Madison County Jetplex was dedicated; and neutral buoyancy tests investigating on-orbit maintenance was initiated. The following topics also received attention in the document: integration; test, operations, and logistics; Common Module; Manufacturing and Technology Lab; Lab Module; propulsion and vehicle accommodations; and manufacturing and quality assurance.	2-8166-C6H-007
	This document was also given another issuance number: MM B070.26. This revision makes obsolete earlier versions/updates (MM B070.2F & MM B070.2). This document is designed to meet a need for assembly within one volume of the MSFC approved BL list of multiprogram specifications. It provides a ready reference & abstract data pertinent to approved specifications through which important benefits may be realized in performance, cost, or schedule. It is to provide a basic selection of specifications that are to be used in defining technical req & verification criteria for end items fabricated or procured for MSFC programs & projects. Annexes A thru D of this manual cover documents having general, unrestricted applicability to most programs/objects. This manual is applicable for use by organizational elements of MSFC that are responsible for the definition or contractual implementation of engineering reqs applicable to the	JB400088

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85/12/13	design, development, & fabrication of items manufactured or procured by MSFC.	
85/12/15	This is the seventh monthly status report submitted in accordance with the reqs of DR-14. The period of time covered by this report is 11/1/85 through 11/30/85. This document provides a summary of MMA activities in support of MSFC SSP that occurred during the reporting period & highlights activities that will occur in the near term and are significant to the project. Efforts were directed toward refining RUR-2 data & implementing NASA decisions in the development of IRR data. Major activities were: supported Theme Teams on weekly reviews; supported SSPQ Quarterly Review; completed & presented Integrated Assembly Study; and developed DR-09 Cost Data to be presented the first week of Dec. 85, including schedules to Level 5 of WBS. Sys engineering, CM, LogM, MTL, P&VA, ADP, ops, logistics/maintainability, TMIS, and productivity are discussed herein.	SSP-MMC-00036
85/12/16	This document is a plan which discusses the A&R which are to be aboard the SS. The SS A&R plan is divided into IOC, growth, & advanced phases. It is further divided into the mechanical & s/w functions. Potential tasks for robotic ops were established & reviewed w/respect to timeframe readiness. The A&R Plan Strategy, the A&R Plan Details, Trade Studies for Evolutionary Growth, Implementation Plan, ADP, and Technical & Scientific Base/Terrestrial Applications are also included.	RI/RD85-319
	This document is a progress report for the period from 3 November 1985 through 3 December 1985 concerning the Space Station Body Mounted Radiator (BMR) System. During this report period, the following tasks were engaged in: analytical tasks to evaluate the effects of the Dual Keel configuration on the BMR System; further trade studies on radiator configuration; potential heat rejection from the modules; and the payoffs for use of diode heat pipes for the 60 degrees inlet temperature case (analyzed for both beta angles of 52 degrees and zero degrees).	3-14000/5R-54
	This document is the first issue of the config & subsystems prelim design data for both a man-tended & permanently manned SS. This document & later issues will define the prelim design & major component operation, interactions, & interfaces. Included herein are discussions of the following: Design Trade Off Studies; Interface reqs; Specification Tree; Operation; Design Data; Results of SSIS analysis; Results of Product Assurance Requirements Review; Recommended Changes to Missions, Operation, and System Req; Man-Tended Analysis & Trade Studies; and, Description of Analytical Tools, Models, and Data Base.	RI/RD85-320
	This document is the November 1985 progress report for work done in Berthing Mechanisms activities. Phase I Characteristics & reqs were completed. Phase II conceptual designs were completed. In Phase III, evaluation criteria are continuing to be formulated & concentrate on function & producibility; design concepts for the flexible berthing half that were evaluated included gimbal rings; materials & design for flexible bellows were evaluated; evaluation was done on several berthing structural latch mechanisms. Future work and problems were also considered.	MDCB-36417 PR6
85/12/18	This document concerns itself with EMS item R3.4.2 and it defines the overall resources required by the power system in each resource area based on reference concepts & system trade analyses completed by WP-04. Power sys resource reqs have been collected & compiled based on data generated by WP-04	IRR4EMS-R3.4.2

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95/12/18	and are being provided to the other WPs & Level B based on the guideline requests for information supplied to WP-04 by the other WPs on Level B. The information provided in this submission was to be revised & updated as part of the IRR process in January 1986.	
	This document is a WP-04 EMS document with the theme of maintainability. It contains discussions of the following EMS theme tasks: Define ORUs; Accessibility Studies; Special Tools Reqs; Maintenance Analysis Including Time/Skills Reqs; Fault Tolerance/Maintainability Analysis; and On-Orbit vs. Ground Repair.	IRRAEMS-STRAT.5
	This document provides an executive summary of the Operations Planning for SS support. It presents the most important features in four areas of ops, which are covered in more detail in the following appendices: A) Prelaunch Ops Plan; B) Orbital Ops Plan; C) On-Orbit Maintenance; D) Logistics, Resupply & Resupply Plan; E) Integrated Logistics Support Plan. The scope of these plans addresses operational support for those WP-01 responsibility assignments to MSFC in the RFP/SOW. They are summarized & include h/w & s/w elements & subsystems, as well as system level responsibilities.	SSP-MMC-00015
	This document sets forth the results of a detailed review of applicable documents which are presently being considered for imposition during SSP design & development phases C/D. The documents reviewed are those listed in Attachment C-7 to the SOW. The purpose of this review was to recommend deletions, substitutions, or modifications to the documents listed where such can be shown to be cost effective to the SSP. The titles & descriptions of each document are provided. The following are samples of the documents included: Product Assurance Reqs for SSP; Space Shuttle Sys PA Handbook; Guide for the Evaluation of Human Exposure to Whole Body Vibration; SS Fracture Control Plan. Also included herein is a User Interface Technology Assessment Plan.	SSP-MMC-00023
		SSP-MMC-00023
	This document was produced to report on an analysis which was undertaken to consider the overall range of options implied when discussing the level of metrication involved in applying SI units to the SSP. Included is an impact assessment of the metrication. The study concludes with a recommendation that a soft metric program be adopted for SS & that this req be imposed on the SSP as an IRR decision to permit transitioning to this sys as early as possible.	SSP-MMC-00026
	This report discusses the progress & monthly status of the "Advanced Planar Array Development for Space Station Program" for the period 1 November 1985 through 30 November 1985. The following work was accomplished during this work period: blanket design & analysis- prelim design work continued at a reduced level to support Task 2.0 efforts; fabrication & tests- the superstrate & hinge bonding tools were completed; panel fabrication & testing- all activity for Task 3.0 was deferred until FY 87. Current problems involving manpower, material, and management are discussed. Work in process for the 3 tasks is also discussed.	LMSC-D973475
85/12/19	This document concerns itself with Operations Planning and was prepared in response to DR-07 of WP-04. Operations Planning, as discussed herein, provides an approach for all orbital & ground ops required to launch, assemble, & maintain the EPS for the SS. Planning consideration is given for all	RI/RD85-317

85/12/19 phases of SS development beginning with initial assembly & carrying through IOC to FOC, and includes SPs and free-flyers. Planning consideration is also given to EPS modification, as necessary to support growth, and to end-of-life disposal. Groundrules & assumptions and supporting documents are discussed herein.

This document contains the configuration & subsystem preliminary design data for the SS WP-3. This document, in its entirety, consists of 9 major sections located in 8 separate volumes. This particular volume is entitled "Introduction" & "System Engineering and Integration." The following topics are covered in this volume: SS architecture (manned core, attached p/l's, SLM, servicing, module configuration, SPs); Special emphasis areas (SSIS, AI, man-tended); growth summary & conclusions (customer servicing, attached p/l's, SLM, design-to-cost, advanced developments, IOC).

GE/TRW DR02 (S1/2)

This document contains the On-orbit Maintenance Plan which addresses the On-orbit Maintenance planning function in mostly generic terms. It establishes the on-orbit maintenance concepts, guidelines, and req for achieving the readiness and safety standards established by NASA, with optimum use of manpower, facilities, material, & funds. The document is a Level B program planning document which serves as the baseline for on-orbit maintenance operations and includes req for SSPE maintainability design, development, and operations. This document establishes on-orbit maintenance concepts & procedures & identifies those WP-3 guidelines and req necessary to perform a common maintenance program for the SLM, SPs (co-orbiting & polar), customer servicing equipment, and attached P/L accommodations.

GE/TRW DR07

This document deals with the T&V considerations for the SS EPS. Section 2 outlines the WP-level i/f's b/w the EPS & the other SS WPs. Also considered are i/f's with other key program elements including GSE, the NSTS, and the SS crew. I/Fs of both a physical & functional nature are discussed. Section 3 contains RI's planned approach to verification of physical, functional, & s/w i/f's. Section 4 reviews RI's preliminary analyses in a number of areas, as they relate to WP-level i/f verification. Subjects covered in this section include the use of simulators, ground vs on-orbit verification, the prototype vs proto-flight approach, growth interface verification, and the use of BITE.

RI/RD85-316

This document establishes the req necessary to implement the objectives of the SS Integrated Logistics System and sets forth the concepts that shall govern all activities providing logistics for WP-3. The major objectives of this document are 1) to provide common direction & control required for guiding the efforts in meeting the logistical needs of the program, 2) to establish the orderly development & integration of the ILS elements, and 3) to assure communication and coordination among all participating organizations. The provisions of this document apply to all organizational elements & their contractors. This document addresses logistics throughout the program life & shall be used in the accomplishment of SS hardware/software for flight and ground systems, subsys, and end items.

GE/TRW DR07

This document is a maintainability report which presents an orderly approach to ensure that the supportability characteristics incorporated in the WP-3 SS element designs provide the required availability when maintenance is performed in accordance with prescribed procedures & resources. Relationships between maintainability engineering & maintenance engineering are described &

GE/TRW DR07

85/12/19 the methodology for maintainability engineering tasks conducted in Phase B are defined in additional detail. The maintainability engineering tasks addressed include performance of Failure Mode, Effects & Criticality Analysis, and Maintenance Analysis, as well as definition of ORUs, assessment of design fault tolerance & accessibility, determination of special tool req, & evaluation of on-orbit vs. ground repair potential.

This document is an Orbital Operations Plan which is to act as a guide for the purposes of the DR-07 data input & the Flight Operations Program Definition & Req Document. Each major section of the Orbital Operations Plan will be evaluated utilizing a standard approach. The elements used in the approach include: objective, scope, evaluation criteria, WP-3 operational criteria, findings & conclusions, and recommendations.

GE/TRW DR07

This document is section 3 of a 9-section, 8-volume set of documents reporting on the GE/TRW WP-3 study efforts. The following is covered in this volume which deals with the SLM: objectives & requirements (science, attached p/l's, servicing, common module subsys, stowage, growth); functional allocations w/in the SLM (ECLSS, TCS, water & waste management, power distribution, safe haven, customer facilities); and, design concept (horizontal option, vertical option, user accommodations, subsys definition (TCS, power distribution, SLM information sys, ECLSS, secondary structure), mass properties & physical characteristics, and resource requirements (electrical req, thermal req, fluid req, Information and Data Management System).

GE/TRW DR02 (S3)

This document is section 4 of a 9-sections, 8-volume set of documents covering the findings of GE/TRW in their WP-3 study effort. This volume deals with attached payloads. The following topics are covered: design trade-offs & sensitivity analysis; requirements; & design concepts (system design, subsystem [TC, command & data handling, pointing & articulation, commonality]).

GE/TRW DR02 (S4)

This document is section 5 of a 9-section, 8-volume document reporting on GE/TRW's WP-3 study effort. This volume concerns itself with Customer Servicing. The following topics are covered underneath the main heading: design trade-offs and sensitivity analyses (configuration, capacity, man-tended approach); requirements & concepts (mission, operations, servicing, IOC & growth capability, design, subsystems, mass properties); and, key considerations (typical servicing missions, reference mission set, IVA & EVA, servicing of platforms).

GE/TRW DR02 (S5)

This document is section 6 of a 9-section, 8-volume set which reports on the GE/TRW study effort in the WP-3. Section 6 concerns itself w/platforms. The following is a list of topics & subtopics dealt with in the document: configuration design, architecture, modularity, STS lift capability, SP max P/L vs. STS enhancement, launch, servicing altitudes, OMV, electrical power, IOC power req, power generation, energy storage, bus power frequency, bus voltage, propulsion, refueling, commonality, orbits, p/l accommodation, subsystems (power, C&T, propulsion, GN&C), p/l carrier, modular interfaces, growth accommodations. Appendix A contains Platform System Specification Summaries.

GE/TRW DR02 (S6)

This document is section 7 of a 9-section, 8-volume set of documents which report on GE/TRW's efforts in the WP-3 study. The subject of this volume is SSIS. The following are discussed in this document: trade studies; WP-3 SSIS architecture; requirements regarding processing & storage, C&T, functional; architectural design concept (system components, space components, p/l interface,

GE/TRW DR02 (S7)

85/12/19 remote acquisition, workstation, scheduling, A&R, ground components, p/l planning & operations centers, customer service, data handling center, interfaces (with GPS, NSTS, TMIS, free flyers, ground & space components), architectural design characteristics (space component, SLM information sys, attached p/l DMS, SPs, customer servicing data sys, ground components). Appendices are included which deal with trade studies on AI, configuration, p/l data, cross-links, communication links, TDRSS throughput.

This document is section 8 of a 9-section, 8-volume document conducted by GE/TRW in their WP-3 study efforts. This section is entitled "Man Tended Configuration" and reports the study of the Man Tended Approach for the SS as it relates to WP-3. The following is a list of MTA areas covered under this topic: scenarios, reference configuration, guidelines, IOC p/l screening, resources, inspection logistics, impact of WP-3 end items, customer servicing, SLM, attached p/l accommodations, and cost estimates for customer servicing, SLM, & attached p/l's. 3 appendices include the following: A-initial PMC configuration description; B- MTA impact of mission performance of SATS 4; and, C- crew req for SATS4 missions.

GE/TRW DR02 (S8)

This document is the second issue of the document numbered RUR2-4EMS-C1.4.2. The objective of this EMS item continued to be to assess the impact of power sys options on the SS & SP architectures and also assess the impact of these architectures on the power sys options. The objectives of this document is to assess the relative impacts for the approved architectures & the reference power sys configs. The approved architectures are the dual keel for the SS, and the RFP version for the SP. The reference power sys configs are PV-RFC, SD-CBC, and SD-ORC for the SS and PV-NiCd for the SP.

RUR2-4EMS-C1.4.2

This document is to provide NASA with time-phased expenditure lines for the MTD Study & A&R Plan. The document was produced as a result of BAC's study of how elements of the SS would change should the introduction of the Manned Habitat be delayed from 3 to 5 years following initial deployment.

D483-50060-1

This document presents the conceptual evolutionary growth scenarios for the power generation, power management & distribution, & energy storage subsystems studied during SS EPS conceptual design. The objectives of the analyses of SS EPS growth potential for each of the power generation concepts were to determine the following: a) characterization of mission reqs to establish extent of growth to meet those reqs; b) design concepts for meeting the required growth in block changes, c) incremental costs required to achieve each block change, d) EPS output at each block change, e) growth schedule, f) optimum design through tradeoffs, g) limiting factors, h) necessary assumptions, & i) growth flexibility to meet changes in program & technology. Some technical problems to be analyzed re add-on power generation: transportation constraints, assembly, integration reqs, physical size of module, power losses, conductor mass, cost, structural reqs, boom length, ultimate goal, shadowing, drag, & voltage reqs.

RI/RD85-307

This DR-07 document is intended to provide the operational documentation to allow visibility into the operational capabilities of the SSPEs of WP-3. DR-07 is composed of 5 individual sections, the first of which is an Operations Planning Summary document which will integrate all of the operational aspects of the SS as defined in WP-3. The remaining 4 sections will address the specific operational areas of Pre-Launch Operations, Orbital Operations, On-Orbit Maintenance, and Logistics. These sections will support the Summary

GE/TRW DR07

85/10/19 Document and be included as appendices. Each appendix is presented in a format which corresponds to that operational area's existing plan.

85/12/20 In this WP-04 EMS item, the objective is the identification of element/sys & sys/sys I/Fs with other WPs. The objective of this submission is to update the previous submissions by adding a new level of detail & incorporating the new available information from Rocketdyne, TRW, & LeRC.

RUR2-4 EMS-C6.4.4

The purpose of the study reported on herein is to define functionally common system/subsystems in each SSPE, including flight, GSE, ASE, ground support functions, procedures, & training. The key results of the functional commonality analysis to date include the identification & establishment of: study logic, approach, commonality categories/definitions, identification of individual sys/subsys specialists, comprehensive shopping list of functional commonality candidates, classification & coding, sys/subsys codes & descriptions, characterization parameters, operational suitability factors, guidelines/groundrules (NASA & RI), and levels of commonality.

SSS85-0235

The purpose of this document is to describe the preliminary test and verification plan that will be followed in certifying that the various hardware and software elements developed for the Electrical Power System (EPS) perform in accordance with the operational mission requirements of the Space Station as defined in the Space Station Flight Operations Description and Design. This plan also includes the management definition, implementation, and reporting details for the verification activities. This preliminary plan covers hardware and software development throughout the different phases of development, qualification, acceptance, pre-launch preparations, and on-orbit verification.

45300.100-DR4

The scope of the study reported on herein is the definition of commonality candidates, their applications across all segments of the SSP, and their impacts in terms of cost & technical risk. Applications that satisfy the cost constraints are being selected. The overall objective of the commonality analysis trade study is to define the options for cost savings thru identification & selection of common h/w, s/w, support equipment, standards, & procedures & training as defined by the NASA RFP.

SSS85-0234

This appendix discusses logistics, resupply, & recycle in terms of operations planning. It describes the plan to accomplish reqs for logistics, resupply, & recycling. Emphasis is placed on logistics engineering analyses, logistics elements, & logistics management information. Descriptions of inter and intra logistic program management structure, concepts, & strategies must be accomplished. Also the overall logistics support concept which highlights the effect each logistics element has on total logistics effort must be defined.

SSS85-0208

This CA Report presents the results of RI's efforts to answer the following questions: what is the best resource mix, w/in SSP cost goals that optimizes mission capture; what are CA features & constraints of the SS; what are the CA features & constraints as they apply to international partners; what are customer integration issues; what are customer transportation issues; and, what are customer operations issues? The document does the following: understand the groundrules, assumptions, & philosophies of the overall SSP; review all necessary data sources required for the analysis; define the functions the design must provide; determine the reqs of those functions; derive a reference design to meet those reqs; and, assess the reference design. Section 2 discusses

SSS85-0207

85/12/20 the permanently manned core SS. Section 3 discusses the MTA SS. Section 4 treats special topics: ease of security; ease of p/l packaging; integration & checkout. Section 5 summarizes the major CA questions.

This document concerns itself with EMS item S3.4.1 and seeks to define logistics items, quantities, frequency of need, and on-orbit storage for up and down cargo. The objectives of this submission are: to identify resupply items for consumables, replacements; to identify the overall mass & volume of down cargo items for replacements; to identify items required for on-orbit storage; and, to identify frequency of need for up-down cargo items.

IRR4EMS-S3.4.1

This document contains a report which supports the definition of the SSE & documents the s/w development, test, & verification requirements. The goal is to establish an approach to s/w development which addresses SS phase C/D activities, with special emphasis of the testing & verification component, and to show how tools provided by the SSE would be used to cost effectively produce &/or acquire s/w. There are 3 SSP-unique aspects which have major importance for the s/w development effort: an evolutionary approach to development, a goal of cost savings by finding areas of commonality where s/w components can be reused, & the mandated use of the Ada programming language & the associated s/w technology. This report consists of 5 major sections: Intro, Approach Employed, Definition of Software to be Developed and the Development Methodology, SSE Requirements, and SSE Operational Model. The document contains The Software Test & Verification Plan and the Software Support Environment Requirements.

RCA-DR16

This document contains a review of the Applicable Documents listed in Attachment C-7 of the SDW of WP-3, DR-10. In this document, the applicable documents are listed in Table 1 in the sequence of accession number with document number & title & with RCA's recommendation that the document be ascribed as written or modified for the SSP. In Table 2, where applicable, the specific paragraph recommended for modification is identified; the content of the modification is presented; and finally, an estimate of the cost savings is included.

RCA-DR10/ADR

This document contains appendices for the Customer Accommodations Report. App. A 1.2 includes a listing of documentation pertinent to CA from companies other than RI, NASA, & foreign sources. App. 2.3.1-a provides a comparison of reqs in SS capabilities. App. 2.4 gives design reqs. App. 2.5 covers CA trade studies & analyses. App. B 3.3.2 provides the MTA 1992 Mission Analysis. App. B 3.5 provides CA trade studies & analyses.

SS85-0207

This document contains sections 6&7, Book 3 of the DR-06 submittal regarding customer accommodations. Book 3 concerns itself with CSF Customer Accommodations Analysis and SSIS Customer Accommodations Analysis. Customer Req analysis is given: SS-provided utilities, support req, environmental constraints, mission grouping test sets. Concept definitions: CSF location, enclosure of servicing bays, number of bays, crew workshop support, p/l retention systems, ORU storage. Customer accommodations features of concepts, concept assessments, resources/cost trades were examined. Under SSIS Customer Accommodations analysis, these are discussed. Customer req: mission grouping test sets, communications, onboard data storage, p/l data storage on ground, storage req for data buffering, ancillary data, storage & data rate req for SLM & SP-4, support req. SSIS Design Concepts affecting Customer Accommodations: ancillary data, mass storage devices, data security, command generation/validation, real-time control, h/w & s/w. Evaluation results given

RCA-WP3-CA BK.3

DATE	ABSTRACT	ID NO.
85/12/20	<p>This document contains the Applicable Documents Review for DR-10 of NAS9-17365. 28 documents related to the SSP are reviewed and changes in those documents are recommended. The changes for each document are listed on a separate page. Subjects under consideration: man's weightlessness; materials & processes; FCP; TDRSS; colors; design reqs; engineering design; military systems, equipment, & facilities; microbial contamination; habitability; mission reqs; polymeric material; stress corrosion cracking; structural strength; manned spacecraft criteria & standards.</p>	SSS85-0213
	<p>This document covers WP-04 EMS theme S4.4.1 and it takes for its subject Module Commonality Analysis. The objective of this task is to determine the optimum application of common EPS items to the common module. These items are to include h/w, s/w, & standards. The objective of this submission is to provide the final list of commonality items for the common module during the conceptual design phase.</p>	IRR4EMS-S4.4.1
	<p>This document details the RCA team's plan for implementing A&R for SS IOC & for subsequent growth stages. The document consists of 7 sections & 2 appendices. Section 2 provides background information for the study. Section 3 describes the approach which was followed in developing the plan. Section 4 details the mechanism used for selecting & evaluating A&R candidates. Section 5 gives the framework that will be used for the detailed exposition of A&R candidates which meet selection criteria. Section 6 summarizes parallel efforts in industry & universities which will complement the application of A&R on SS. Section 7 contains conclusions & recommendations for the A&R plan. Appendix A provides supporting materials which are referenced in the document. Appendix B contains the current collection of conceptual designs for proposed A&R candidates.</p>	RCA-WP3-ARP
	<p>This document discusses 2 WP-04 EMS themes: Resource reqs & Customers Accommodations. The objective of the first item is to collect power reqs for housekeeping & for use by customers. The objective of the second task described here is to provide feedback to the customer specifically to inform him as to how well the power sys can meet his needs. At this point the customer may appeal to a higher authority or modify the reqs specifically in R3.4.1.</p>	IRR4EMS-R3.4.1
	<p>This document discusses ground vs on-orbit checkout & verification for on-board distributed systems (e.g., DMS, C&I, & Power) which would be difficult to verify and checkout anywhere except on-orbit. The objective of the trade study reported on herein is to determine an optimal, cost-effective balance between ground & on-orbit checkout activities for sys test & verification during SS IOC build-up. This analysis examines checkout tests which must be performed on-orbit and those tests which could be best performed on-orbit. The goal is to determine an approach characterized by minimum facilities, OSE, and special test equipment reqs consistent with acceptably low technical & schedule risks.</p>	SSS85-0229
	<p>This document discusses logistics under WP-04 EMS item S3.4.3, define ground accommodations & storage. The objectives of this item are: to identify all reqs for ground accommodations & storage; to specify storage volume, mass, handling reqs, personnel training reqs, installation, checking, & servicing reqs; to identify special environmental reqs for storage & preparation; for time-phasing of storage reqs, which includes inventory management & warehousing; and, to recommend an approach. This particular submission seeks to identify individual number, mass, volume, and some dimensions of items for ground</p>	IRR4EMS-S3.4.3

85/12/20 accommodations & storage, in addition to the overall number, mass, volume, & floor area required for storage; and to specify storage volume & mass.

This document discusses the topic of metric conversion. The specific focus of the study reported on herein was to assess the impact on cost & schedules of converting to SI metric units & metric standards in sufficient time to prepare for Phases C & D. Considered is the idea that the SS, with its international orientation, will be the key to whether the aerospace industry goes metric by 21st century. Included are examinations of the following: study approach & logic, benefits & advantages, issues & considerations, and impact evaluation.

SSS85-0187

This document is a report of WP-02 study with objective of developing an effective, efficient SS growth plan. This version of evolutionary growth plan deals primarily with growth reqs as derived from user mission reqs, technology issues related to ADPs, & prelim config designs which fulfill FRE specifications. Section 1 discusses key technical, schedule, & programmatic issues inherent to developing a resilient, flexible, evolutionary growth plan. Section 2 formulates 4 alternate mission scenarios for the post-2001 time frame by trend analysis of current program reqs, ongoing research, & enhancing technology developments. Sect. 3 defines technically feasible & affordable SS configs for each alternate SOS architecture & mission scenario. Sect. 4 defines subsys-level block changes by flowdown of timephased functional reqs which are matched w/probable increment step sizes. Section 5 discusses trade methodology, evaluation criteria & option selection process used to develop flexible, resilient growth implementation plan.

SSS85-0209

This document is a report which examines the advantages & disadvantages of ground & on-orbit verification as well as the options for delivery of the test articles to orbit. Preliminary results are summarized for several candidates. The trades discussed in this report are closely related to, and were performed in parallel with, those described in S6204.3 & S6201.3. The primary objective of the study activity involved here is to perform trades to establish an optimum balance between ground & on-orbit verification testing.

SSS85-0232

This document is a System Test and Verification Plan. Section 1 includes the definition of the purpose and scope of the plan; the purpose acknowledges this plan as an input to the overall SS Test & Verification Plan; the scope includes those activities necessary to demonstrate overall SS capabilities from initial development through operational support. Section 2 addresses the various verification program segments and their relationships. Section 3 contains detailed guidelines used in verification planning and subsequently in program implementation. Sect. 4 contains a summary of the test & analysis programs currently identified for each of the WP-02 end items as well as the integrated verification associated with overall SS performance. Section 5 addresses the manufacturing checkout & acceptance tests for WP-02. Section 6 summarizes maintainability demonstration aspects. Section 7 describes 4 categories of support equipment for the SS (BSE, FSE, DSE, & STE).

SSS85-0206

This document is a WP-04 document which takes as its EMS item Scar Definition. This EMS item is to identify "scars" related to the SS electric power generation sys that are needed or desirable for the IOC or MTA SS. Scars for SP are also to be identified. The objective of this submission is to recommend desirable scars relating to the electric power generation sys.

RUR2-4EMS-C2.4.2

85/12/20

This document is Appendix A of the DR-07 submittals. The purpose of this document is to define SS elements (SPs, SLM, APs, & CS) through KSC and VAFB. This includes the integration, test & checkout, and launch of the initial & follow-on SS elements, as well as the return, refurbishment, maintenance, reconfiguration, & re-launch of the cyclical elements. The pre-launch operations plan provides a concept & various scenarios that will be required to accomplish SS pre-launch processing. The general SS ground operations philosophy is defined in this plan and key ground rules & assumptions are identified. Documentation necessary for req & their implementation is identified, and the concept for the ground operations processing team is defined. Standard launch-site operations are specified & flows & schedules for the initial, cyclical & follow-on SS elements are provided. Facility & equipment req & implementation approaches, customer interfaces, safety & security, & contingencies are discussed.

RCA-WP3-0F APP A

This document is Appendix B of the WP-3, DR-07 submittal to GSFC concerning Operations Planning. This document deals specifically with orbital operations. This plan covers the actual operations involved from the point where flight h/w is removed from the STS, through installation on the SS, verification & checkout of installation, initial, routine, & contingency orbital operations, removal from the SS at the completion of operational life, & installation into the docked STS for return to earth. Appendix A covers procedures preceding launch. The following are discussed within: SPs, CSF, SLM, PAE, APs, EVA, DMV, contamination, tethers, communications, MMU, RMS, commonality, safety, autonomy, automation, & security.

RCA-WP3-0P APP B

This document is Appendix C of the 5-part set which comprises the Preliminary report of the WP-3 DR-07 study. This volume deals with On-orbit Maintenance Plan. The On-orbit Maintenance Operations Plan is a WP-3 program planning document which is the BL for in-flight operational maintenance & includes req for the flight maintainability design, development, and operations. This document establishes the on-orbit maintenance concepts, guidelines, & req for the development of the WP-3 elements of the SSP. The on-orbit maintenance plan discusses the following topics: documentation tree, levels of maintenance, ORU maintenance, on-board diagnostic operational data, configuration, mission req, engineering design, maintenance using MMU, MRMS, DMV, MDB, GSP, AMMS, & logistics.

RCA-DR07-1C

This document is Appendix D to the DR-07 submissions to GSFC regarding Operations Planning. This is a preliminary document, to be followed by an Interim plan and then a Final Plan. This document defines the analyses approaches & results and also establishes the requirements necessary to implement the objectives of the SS Integrated Logistics System. It sets forth the concepts that will govern all activities providing logistics for the Program Elements (AP, SLM, SPs, servicing), used in the SSP. The major objectives of this document are (1) to provide common direction & control required for guiding the efforts of the contractor team in meeting the logistical needs of the SSP; (2) to establish the orderly development & integration of the ILS elements; and, (3) to assure communication & coordination among all participating organizations. This document addresses logistics throughout the program life cycle & it to be used in the accomplishment of logistics activities.

RCA-DR07-1D

This document is Book 2 of a 3-book set dealing with CA under WP-3/ DR-06. This book specifically considers the outfitting of the SLM and the SPs. The document is divided into 2 sections: (1) SLM CA Analysis: customer req

RCA-DR06-2

85/12/20 (utilities, support req, environmental constraints & special needs (microgravity req, contamination, noise, DM), mission grouping test sets, concept definitions (internal configuration, bioisolation, specimen centrifuge), CA features of concepts (internal configuration of SLM (horizontal vs. vertical), bioisolation, specimen centrifuge, manned vs. MTA SS), concept assessments, and alternate resources/cost trades. (2) Platform CA Analysis: CA req Analysis (utilities, p/l's, environmental constraints or special needs, mission grouping test sets, SP concept definitions (polar, co-orbiting), modularity concept, p/l spacing concept.

This document is Book 5 of a 7-book set which was submitted by RCA under the provisions of DR-02. This specific book deals with Customer Servicing. A Summary is given of the concepts of conducting customer servicing at the SS. Requirements & configuration for Customer Servicing are discussed as they relate to servicing/re-fueling bays, fluid management facility, storage, attached p/l's, tools, OMV, OTV. Customer servicing interface, a Customer Servicing Specification Tree, and Customer Servicing Mission and Analysis & Operation are discussed. SSIS and C&T discussion, Review of Product Assurance Documentation, & discussion of Man-Intended Approach are discussed, as are Customer Servicing Tools, Models, & Data Base Information.

RCA-DR02-5

This document is Book 6 of a 7-book set submitted by RCA as required by DR-02. This deals with the SSIS. This document presents the specification of functional & performance req for the SSIS from WP-03 point of view. It focuses on the req that the SS customer places on the SSIS. It enumerates the req placed on SSIS by SP, SLM, & AP. Section 2 presents the list of applicable documents. Section 3 first presents the definition of the SSIS functions. It then presents the set of criteria by which these functions were allocated to WP-03 projects, ground elements, and other WPs. Next, the actual function sheets were included, with complete traceability to the SSIS req. Finally, in analysis of performance req, based on the SATS, is presented. Section 4 contains the SSIS architectural design concepts and interface definition. Appendix A provides the results of trade studies which supported the definition of SSIS reqs and design concepts.

RCA-DR02-6

This document is book 7 of a 7-book set prepared by RCA under provisions of DR-02. Book 7 concerns the Man-Tended Approach. The following SS elements as part of the MTA are described: missions, SLM, SPs, satellite servicing facilities, and attached p/l's. Under the SLM MTA, the following are discussed: types of experiments possible, scientific potential, module layout, power, maintenance, A&R, remote control. Under SP MTA, the following are discussed: results, A&R, costs. Under Impact of Satellite Servicing Facility, the following are discussed: MTA considerations & costs, A&R, options & conclusions. Under Effect of the MTA on the attached P/L accommodations the following are discussed: effect on PAE design, A&R required for PAE during unmanned periods, and effects of the MTA on Attached P/Ls.

RCA-DR02-7

This document is the first WP-3 submission under DR-07, Operations Planning. This Preliminary Plan is to be followed by an Interim Plan & a Final Plan. This document summarizes the contractor obligations in performing WP-3 Phase B, Level C for SSE of SPs, SLM, attached P/Ls, & Customer servicing. The operations planning covers the entire life cycle of these elements, starting with pre-launch operations, launch phase, in-orbit operations, on-orbit maintenance, & post-landing operations. An integrated logistic system is also investigated which covers these elements from the design phase until they

RCA-DR07-1

85/12/20 retired at the end of their useful lives. WP-03 Contractors are responsible for POP, COP, SLM, AP, and CS during their life-cycles. The details of Operations Planning are covered in the 4 appendices (A- Pre-launch, B- In-orbit, C- On-orbit, & D- Integrated Logistics Plan).

This document is the summary volume to the 5-volume set which describes operations planning. Operations planning encompasses all aspects of the SSP not directly related to the design, development, manufacture, & verification of the h/w & s/w. Operations planning for a deliverable system or element addresses all phases of that unit's life from completion of initial reqs thru verification to its final disposal. The facilities through which the unit flows, the processes which control, monitor and status the unit and the ancillary services provided for hte unit's use are included in the Operations Planning Process. This summary gives the groundrules, assumptions, & program description for the preceding. The operations integration processes are covered. Supporting data for the following are given: future operations plan, specific program options, specific performance capabilities.

SSS85-0208

This document reports on a study, the objectives of which are to:
1)scope the quantity, type, intended usage, & need dates of BIT/BITE & instrumentation analysis data reqs; 2)identify candidates for BIT/BITE;
3)describe the advantages, limitations, & constraints of BIT/BITE vs ground data processing; and, 4) identify options concerning the use of BIT/BITE to minimize GSE cost & complexity. Overall the attempt is to achieve a better understanding of ways to make the SS predominately autonomous from ground control. To achieve this, automatic health statusing, fault detection, fault isolation, & corrective action must be provided on-station and this is the center of discussion in this document.

SSS85-0227

This document reports on an activity the objective of which is to identify verification flows & allocate approaches, options, & trades for projected growth configs. Candidate flows & allocations for each option will be recommended, including verification of modifications, upgrades, & new growth items.

SSS85-0225

This document reports on an analysis, the primary objective of which is to develop ground verification flow networks depicting the overall verification program logic, the candidate tests associated with the high level flow, and the location of the various tests.

SSS85-0231

This document reports on the EMS study which analyzes the comparative effects of proximity ops on the 2 SS power options (PV & SD). RCS plume effects & vehicle clearances were analyzed for the 2 options. Twin keel config was considered for IOC. For the PV analysis, an 8-panel 75kW config was assumed & for SD, a 2-collector 75kW concept was used. The primary purpose of this document is to report analysis results for prox ops that support the power options trade.

SSS85-0233

This document reports on the module outfitting analysis trade study and is to define the options for cost savings through identification & selection of common h/w, s/w, support equipment, standards, procedures, & training as defined by NASA's RFP. The scope of the module outfitting analysis encompasses essentially those equipment identified as commonality candidates in outfitting the various module configs. This submittal finalizes the list of module

SSS85-0211

85/12/20

outfitting commonality candidates to date, as determined through the analysis of the following sys/subsys or areas: crew accommodations, structures, DM, ECLSS, communications, power distribution & control, thermal control, GN&C.

This document was prepared under DR-12 of WP-3 and was designed to report on the findings of the Failure Mode and Effects Analysis. This analysis was to determine the subsystem & system consequences of hypothesized failure modes of individual components. The major goals of this analysis, and those consequently reported in this document are the following: 1) identification of elements that are critical to mission success or safety; 2) identification of interface problems between elements; 3) definition of BIT Equipment & telemetry points to assure fault direction & isolation; and, 4) testing the validity of redundancy provisions for specific failure modes. Project results were given for the following: SP, AP, SLM, & CS. Project results for each consist of a Block Diagram, an Outline of Study Sheets, and FMEA Summary Sheets.

RCA-DR12

This DR document, DR-04, is the System Test and Verification Plan for WP-03 elements. This document establishes the test plans, philosophies, & req for the WP elements & outlines the WP inputs to the overall SSP. The document is divided into 4 major sections & establishes the T&V Program by identifying what is to be tested, how it's to be tested, where it's to be tested, what equipment is to be used, facility req, & support req. For SPs, the principal phases of the T&V Program are: design verification, h/w verification, pre-launch activities, on-orbit checkout, & on-orbit test. The T&V Program for CS will involve the assembly process, handling, & testing activities from the initial design verification testing starting at the component level thru on-orbit tests prior to turn over operational use. The T&V program for AP is established thru the identification of the total content of the program from initial design thru element test. For SLM, involving assembly, handling, test activities.

RCA-WP3-STVP

This EMS input document is a summary of maintainability analyses and includes a description/identification of 1) preliminary maintenance concepts, 2) the results of the ORU alternatives analysis (ORU definition and rationale), 3) the preliminary assessment of annual crew workload for use in the assessment vs. allocation process, 4) identification of maintenance significant items, 5) estimates of major support cost factors. This analysis supported the development of the other maintainability EMS themes, e.g., accessibility, special tools, fault tolerance, etc.. The recommended ORUs, related maintainability data and maintenance concepts are included in Attachment I through X.

SSS85-0230

This is an appendix to the operations planning documents. Appendix B concerns itself with orbital operations. Section 1 specifically addresses the assembly phase from the perspectives of normal launch/assembly sequence for BL config, assembly altitude profile providing for SS lifetime reqs vs orbiter p/l constraints, SS activation & checkout activities, manning reqs for each flight reflecting activities keyed to SSPE p/l, and automation considerations for assembly operations. Section 2 addresses the IOC-phase ops from both the ground support & the on-orbit ops perspectives. Sect. 3 is a compilation of high-level philosophy, guidelines, and reqs roughly grouped into safety, commonality, autonomy, automation, & growth categories.

SSS85-0208

This is Book 1 of a 3-book set in which Customer Accommodations are discussed; this book is an introduction and summary. Section 2 provides a detailed description of the overall CA approach. Sections 3-7 cover the CA

RCA-DR06-1

85/12/20 analysis for attached p/ls, SLM outfitting, SPs, customer servicing facility, and SSIS. Each of these sections in turn discusses customer requirements analysis, concept definitions, descriptions of CA Features of Concept, concept assessments, and alternate resource/cost tradeoffs.

This plan presents data & information clarifying the prelaunch capabilities & reqs of the SSP WP-02 elements. This data is used to determine cost, schedule, design definition, & support reqs for the SSS development, design, manufacturing, deployment, & operation. This plan describes the proposed sequence of ground processing ops to prepare the initial & growth SS elements for launch; also delineated are detailed ops to refurbish, maintain, & reconfigure the cyclically processed SSSEs. This plan evaluates the reqs for facilities, facility modifications, GSE, & personnel to accomplish prelaunch ops to achieve SS IOC & growth. This plan also explains the types of verification methods required & that are the most suitable for SS processing.

SSS85-0208

This report contains a preliminary description of the manufacturing checkout & acceptance tests that ensure delivery of an acceptable product from the factory and the launch readiness operations that ensure readiness for launch to orbit. These activities are integral parts of the verification process. The primary objectives of the activity described herein are to develop ground checkout flows for SSPEs, end items, and subsystems, and to identify major checkout functions, item phasing, support equipment, and facilities associated with manufacturing in-process & acceptance tests and KSC receipt-to-launch activities.

SSS85-0228

This report discusses the EMS which provides the initial logistics & resupply/recycle plan definitions for the SSP. Special emphasis is placed on the identification of spare reqs in support the current ops concept. Also identified are the assumptions & ground rules used during the study from which the life cycle support aspects of the Integrated Logistics Support Program. Commonality, man-tended capability, growth projections, CA, EVA storage & servicing, servicing options, & maintainability were used to establish the results of this analysis, which are also given.

SSS85-0222

This report reviews the available guidelines for the selection of protoflight candidates & discusses protoflight vs prototype trade studies performed on structural & mechanical equipment. The primary objective of the study reported on here is to determine the most cost-effective method of using protoflight hardware.

SSS85-0224

This report, which deals with the definition of a verification envelope, has as its chief objective to define a preliminary envelope for component & element verification. Specifically, the envelope is to address the natural & induced environments to which h/w will be exposed during ground & flight operations. Individual topics of discussion include: environments, certification, criticality, environmental acceptance testing, dynamic environments, acceptance temperature cycling test, certification acceptance testing levels & durations.

SSS85-0226

This WP-02 EMS document updates the approach that RI recommends be used to achieve commonality of GSE, ASE, & OSE commonality for SS. The objective of this commonality analysis trade study is to define the options for cost savings thru (1) identification & selection of related commonality candidates;

SSS85-0212

85/12/20 (2)eliminating or reducing the provisioning of duplicate equipment to satisfy the same or similar reqs to service, checkout, handle, transport, or maintain SSPEs; (3)reduce and/or simplifying testing & verification procedures; and, (4) standardizing material & H/W selection by maximizing the producibility of h/w.

This WP-04 EMS theme document has as its EMS item the following:

RUR2-4EMS-S6.4.5

Ground vs On-Orbit Checkout Trades. The purpose of the activity reported herein is to conduct trade studies to determine an optimal, cost-effective balance b/w ground & on-orbit activities for sys test & verification during SS IOC build-up. This analysis examines verification tests which must be performed on-orbit and those tests which could be performed on-orbit. The objective of this activity is to determine an optimal approach characterized by minimum facilities, orbital support equipment, and special test equipment reqs consistent with acceptably low technical & schedule risks and to determine on-orbit verification guidelines, methods, options, & criticality.

This WP-04 EMS theme document takes as its EMS item "Ground vs On-Orbit Verification Trades." The purpose of this activity is to furnish level B with alternatives & recommendations for the most cost effective approach to the verification of WP-04 components, subsys, sys, & related i/fs and WP-to-WP i/fs. The objective of this activity is to identify the most cost-effective balance b/w ground & on-orbit verification that can be achieved w/o undue risk & to determine verification guidelines, methods, options, and criticality. Key issues in this item are: emphasis on reduced cost, impact of MTA, criticality vs verification scope & flow, test vs analysis trades, sys integration facility reqs, integrated IOC config verification reqs, minimization of facility & GSE costs, maintainability & commonality considerations, & minimize risk to h/w. A summary of supporting data is also given.

RUR2-4EMS-S6.4.6

This WP-04 EMS theme document takes as its EMS item "Protoflight vs Prototype Verification." The purpose of the activity described herein is to provide NASA Level B with data & recommendations to be used in cost analysis & definition of the protoflight vs prototype verification approach. The objective of this activity is to identify trades, options, guidelines, & candidates for the most cost-effective, minimum-risk method of using flight h/w for verification testing. The method is to review past programs for guidance in implementing the protoflight concept, to develop guidelines for the implementation, to identify trades & options as well as candidates from power sys components, and to explore design approaches which maximize the use of protoflight concept with minimum risk to the h/w.

RUR2-4EMS-S6.4.4

This WP-04 EMS theme document takes as its EMS item "Verification Envelope Definition." The purpose of the activity described herein is to determine a realistic, comprehensive description of the environment to which the SS h/w items will be subjected in order to obtain optimal designs. The objective of this activity is to specify the environment envelope within which all SS h/w items will be required to perform. The environment definitions will include all physical parameters such as thermal vacuum, acceleration, vibration, shock, etc. Key issues are: emphasis on reduced cost, protoflight, ground handling/transport/launch loads, assembly operations, and risk to h/w.

RUR2-4EMS-S6.4.6

This WP-04 EMS theme document takes for its EMS item "Test vs Analysis Trades." The specific purpose of this activity is to furnish Level B with data & recommendations to be used for cost analysis & definition of the test vs

RUR2-4EMS-S6.4.3

85/12/20 analysis trades approach. The objective of this activity is to identify test vs analysis trade candidates, guidelines (groundrules, assumptions, drivers) and methods to be used, to consider tests supplemented by analysis/simulation & analysis in lieu of test, to consider effects of design margin, technology base & failure risk, and to establish criticality guideline. The method is to develop guidelines for applying analysis to verification activities, to review options & candidates with technology areas, & to explore design approaches which maximize the use of analysis when cost effective.

This WP-04 EMS theme document takes for its EMS item the following:
BITE & Instrumentation Analysis. The purpose of this activity discussed herein is to recommend to Level B the most cost-effective division of test & verification capabilities b/w BITE & associated instrumentation & GSE. The objectives of this analysis are to scope the quantity, type, intended usage, & need dates of BITE & instrumentation analysis data reqs, to identify candidates for BITE, to describe advantages, limitations, & constraints of BITE vs ground data processing, to identify options concerning the use of BITE to minimize GSE cost & complexity. The method is to define reqs, including the maintainability reqs to isolate problems to the DRU level, to review the experience & results of past programs, to identify candidates for BITE in all end-items & subsys, to identify/evaluate advantages/disadvantages, to establish guidelines for the use of BITE, considering the total BITE costs & the criticality of the item.

RUR2-4EMS-S6.4.7

This WP-04 EMS theme document takes for its EMS item the following:
Ground Checkout Reqs Analysis. The purpose of this activity reported on herein is to determine an optimal approach for the prelaunch sys test & verification of the SS IOC config. This analysis include all ground prelaunch verification activity & isn't limited to activities at KSC. Consideration is given to conducting some verification test on-orbit in the trade study. The objective of this activity is to determine an optimal approach for ground checkout characterized by minimum facilities, GSE, and transportation reqs consistent w/ acceptably low technical & schedule risks. The method is to define reqs for IOC verification tests, to identify options for prelaunch testing flows at launch sites & elsewhere, to define assumptions, groundrules, and selection criteria, to develop scenarios for all ground testing & flow options, to evaluate these scenarios, and to select the cost effect approach, and to document the results.

RUR2-4EMS-S6.4.8

This WP-04 EMS theme document takes the following as its EMS item:
Growth Verification Approach. The purpose of this activity is to furnish Level B with alternatives & recommendations for the most cost-effective approach to the verification of identifiable potential growth items. Included is consideration of reverification of previously existing functions which may be affected by the addition of the growth element or upgrade. The objective of the activity herein described is to identify all potential growth areas, to define alternative approaches to the verification of the growth elements, to analyze WP-to-WP i/f's & internal WP items & i/f's, to consider on-orbit test, ground test, simulation, analysis, and prior history, to establish general guidelines for verification of growth elements, to scope the extent of reverification necessitated by the addition of the growth elements or upgrade, and to determine whether special tests will be required.

RUR2-4EMS-S6.4.5

85/12/31 This document defines reqs for the Propulsion Subsys to SS i/f's which consist of physical, functional, & procedural. This document is applicable to both IOC & growth SS, & to either manned or unmanned or man-tended options of

SS-IRD-0700

DATE	ABSTRACT	ID NO.
85/12/31	the IOC SS. Interface panels, mass properties, dimensional data, S&M, Thermal, electrical, data, communications, ECLS, crew systems, fluids, environments, SS MRMS, & propulsion/GN&C operational I/F reqs are discussed within the framework described above.	
	This document defines reqs for the Propulsion subsys to SS Space Platform interfaces which consist of physical, functional, & procedural. This document is applicable to both IOC & growth configs, unless otherwise specified in the document. Mass properties, dimensional data, S&M, loads, thermal, electrical, data, fluids, environments, propulsion/GN&C operational interface reqs, orbit maintenance, propellant, momentum management, propulsion inhibit, collision avoidance, translation/attitude maneuver inhibit, accelerations, propulsion performance are all subjects given attention in this document.	SS-IRD-0701
	This document defines requirements for the Propulsion Subsystem to Orbiter interfaces, which consist of physical, functional, & procedural. Mass properties, dimensional data, S&M, loads, thermal, electrical, data, and environments (natural, induced, contamination) are also discussed.	SS-IRD-0702
	This document is a monthly USRA progress report for the SS Natural Environment Design Criteria Studies in the month of Dec. 1985. The efforts reported on during this period were those which involved the assembling of comments & other materials relating to the November Upper Atmosphere Meeting.	USRAB-36400 PRE
	This document is a progress report for December 1985 of the Space Station Common Module Power System Topology and Hardware Development Program. The following topics were addressed during the month: network schematics, including redundancy, commonality, current monitors, and ground fault protection. Also commented on in this report was network concept selection which was completed during December 1985. The objectives for work during January 1986 were also outlined in this report.	MCR-85-618-7
	This document is a progress report for December 1985 regarding the Refurbishment of Three Axis Attitude Motion Simulator activity. Refurbishment of Three Axis Attitude Motion Simulator includes electrical-mechanical repair of the existing Hydraulic System, Table servo Motor/Actuator System, & Electrical Power & Instrumentation Cable Wrappers. H/W modifications, system integration, system test procedures development, technical support functions, and technical data & documentation activities are discussed.	SCB-36409 PRE
	This document is the Sperry December 1985 progress report for work done on the Solar Alpha Joint Design. The effort in December was directed toward detail design & analyses to finalize the design & allow generation of the detail drawings. Design of the 108-inch bearing, transition structure, drive mechanism, power/signal module, & electromagnetic components has been frozen and detail drawings generated. Small design changes were made after the PDR. Electronic design was evolving around an existing drive electronics assembly design. Current problems and work to be done in the next period are also discussed.	SPERRYB-36415 PR4
	This report summarizes the progress made on the IRSS program during the period from 11/4/85 through 12/31/85. The work performed during the period, and the activities planned during the next report period are discussed. Technical & programmatic problems encountered are outlined, along with approach planned for resolution. The following was progress made during the period:	MCR-85-654-5

DATE	ABSTRACT	ID NO.
85/12/31	effort was spent in further defining equipment & testing required to characterize the PFMA; work was completed on the modified position/force algorithm; hybrid control structure of Raibert/Craig was summarized; evaluation of optical angle sensors & other optical methods continued; coding of the AI planner was completed & testing began; architectural efforts centered on procurement of control processing equipment.	
86/01/18	This is a report which describes the SS Level-B Logistics Support Analysis to be conducted by MSFC logistics integration contractor and Level-C NASA Centers/Contractors. This plan also specifies the interfaces b/w NASA Level-B and Level-C Centers/contractors and their Level-C Logistics Support Analysis Plan responsibilities. In addition, this plan implements the reqs outlined in JSC document 30000, Section 12. This document defines the MSFC logistics integration contractor's plan for: a) receipt, review, & evaluation of all Level-C LSA data; b) incorporation of Level-C data into SS Level-B LSA data file; c) conduct of Level-B LSA activities so as to ensure consistency of support sys definition, elimination of duplicated effort, ensure identification of surfacing integration reqs; and, d) maintenance of a central data base for Level-B integrated LSA data.	LOG-MMC-00006
86/03/12	The purpose of this report is to summarize the results of analyses conducted to identify & examine prelaunch outfitting location options of where to add the specialized equipment to the common module to form the HM, SLM, and LM elements. Costs, schedules & performance risks, facilities, equipment, procedures, and other operational factors were considered. Data regarding outfitting sensitivities & resource utilization discriminators associated with each option were developed & are provided to NASA in order to arrive at a cost-effective outfitting plan. Four specific options of where & how the common module can best be outfitted to form the SS module elements are identified and are the subject of this report.	ENS-R1.K.1
86/06/19	This document presents the results of the DR-06 portion of the WP-3 study from the point of view of SS utilization. Part of this study assesses how well the SS design concept supports the user needs as represented in the MRDB; the other consists of a description of the GE concepts for facilities available to users in the conduct of their missions & the interfaces b/w those missions & SS. The document uses summaries of matrices & tables which facilitate its use. Section 2.0 gives an assessment of SS utility to users and Section 3.0 describes user facilities for meeting mission req. Section deals with cost considerations. Appendix A is entitled: "Customer Accommodations Analysis 'Assembly, Installation and Servicing Requirements Required of the Space Station Servicing Facilities.'"	GE/TRW-DR06

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